TECHNOLOGY DEPARTMENT

September, 1948

THE FOUNDRY

wherever metals are cast...

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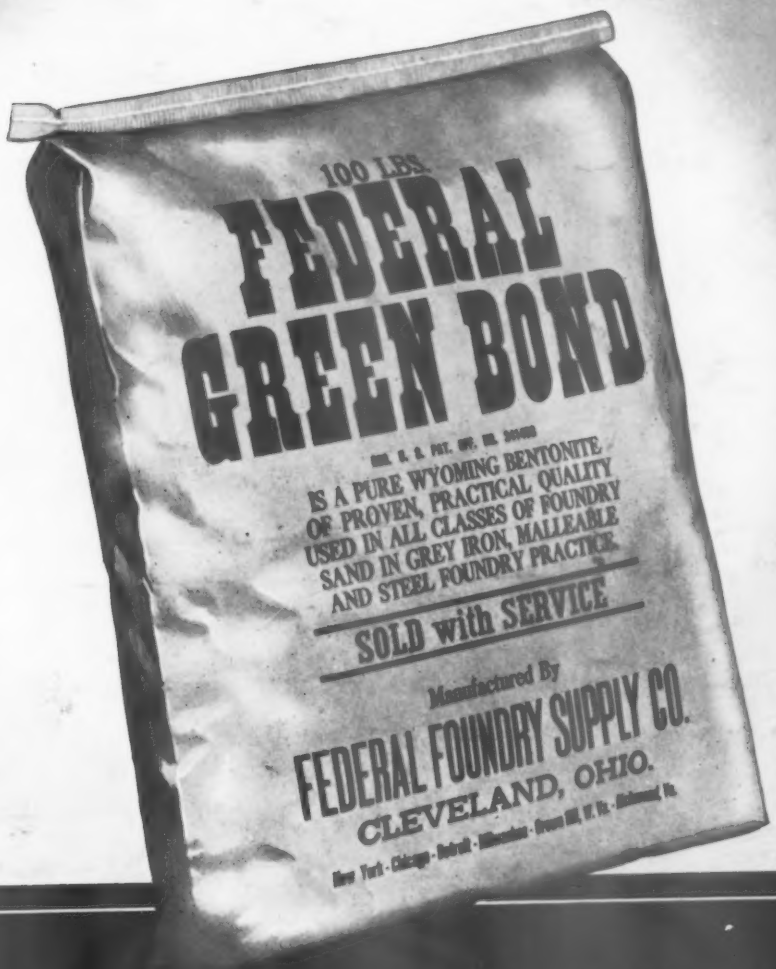
DETROIT



STILL THE BEST OF THE BENTONITES

Floated down inland waterways from Co nellsville, Pa., two home-made river boa docked at Cincinnati in 1842, carrying ca gos of the first commercial beehive cok

LOSS CARGO IN 1842!

. . . Connellsville coke reflects changes in iron industry

PURITE is commercially pure soda ash containing over 98% sodium carbonate, fused and cast into convenient 2-lb. pigs. Its desulfurizing and refining action are traceable to the chemistry of soda ash.

Selling two boatloads of the first "beehive" coke was a losing deal in 1842. Produced on Taylor's Farm in Fayette County, Pa., some of the Connellsville coke went to foundrymen for 8 cents a bushel; the rest was traded for the equivalent of only $30.

Yet beehive coke grew enormously in favor, finally replacing both charcoal and anthracite as iron furnace fuel. Coke usage in 1946—principally by-product coke, which replaced beehive oven coke after 1893—ran close to 3 million tons in foundries . . . over 50 million tons for the entire iron and steel industry.

Along with the use of better fuels, there have been important changes in cupola melting practice—the development of PURITE, for example. It improves melting conditions within the cupola, and fluxes the molten metal of entrained impurities.

Producing a fluid slag higher in the melting zone, PURITE keeps the coke surface cleaner, resulting in hotter melting, with less oxidation of metal. PURITE, in addition, forms a more highly basic slag which washes out sulfur, gases and entrained oxide-slag inclusions, giving a clean, fluid iron.

Ask for pamphlet: "Purite—The Scientific Flux." Write Mathieson Chemical Corporation, 60 E. 42nd St., New York 17, N.Y.

Mathieson

PURITE

Purite (Fused Soda Ash) . . . Liquid Chlorine Caustic Soda . . . Soda Ash . . . Bicarbonate of Soda . . . Ammonia, Anhydrous & Aqua Sodium Chlorite Products . . . Chlorine Dioxide HTH Products . . . Dry Ice . . . Carbonic Gas Sodium Methylate

Omega is a fine-quality tool steel, whether judged by its composition or its dependable performance on cold-battering jobs. Its high shock-resistance makes it the top choice for pneumatic and hand chisels, core breakers and other shock tools.

Omega will keep your chisel costs down, whether you make up your own chisels or buy them already finished. It will stand up under the roughest kind of chipping work.

The cutting edge of Omega is sharp and durable. Shanks are tough and non-peening. And it's easy to re-dress and heat-treat.

Give Omega a trial on your toughest chipping and core-breaking jobs. Specify Omega and you'll have chisels you can always depend on for better cutting efficiency and lower costs.

OMEGA FOR SHOCK-RESISTANCE

- ★ Harden it in either oil or water.
- ★ Easy to forge, machine, heat-treat.
- ★ Unnotched Charpy: 130 foot-pounds.
- ★ Normal hardness of cutting edge: 58 to 60 Rockwell C.

	C	Mn	Si	V	Mo
★ Typical Analysis:	0.60	0.70	1.85	0.20	0.45

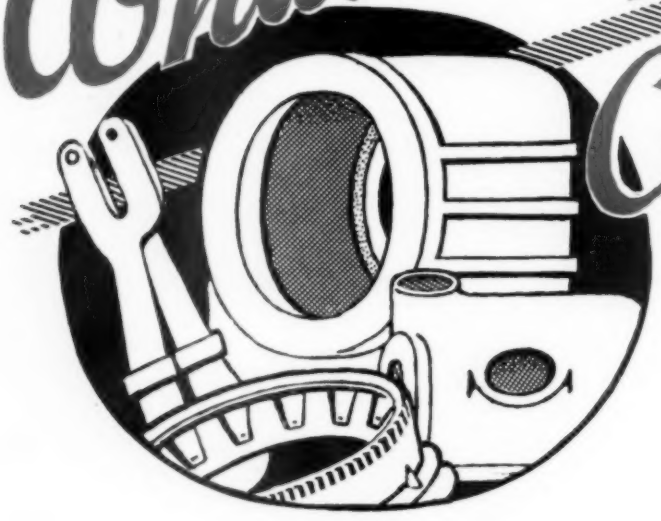
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

★ BETHLEHEM STEEL ★

OMEGA . . . one of Bethlehem's Fine Tool Steels

What are "Healthy" Castings?



● Any casting that is amazingly free from uneven grain, chilled sides, hollow centers or spongy spots is a healthy (sound) casting.

To make healthy castings day after day you must furnish molds with metal that has been thoroughly cleansed of foreign impurities before cupola is tapped.

Leading foundries have made a standard practice of maintaining the best metal structure by adding, to each cupola charge, a few cents worth of—

Famous CORNELL CUPOLA FLUX (METAL CLEANSER)

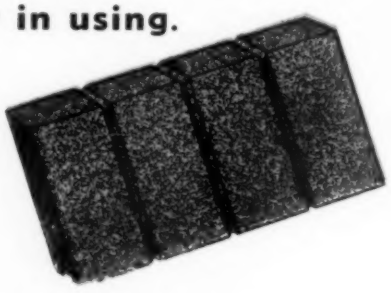
By using this flux your metal will be hotter and freer flowing, sulphur will be reduced and you will pour castings that are not only sounder, stronger, but easier to machine.

Cupolas and drops will be definitely cleaner, and maintenance time and cost will show a decided drop.

Write for Bulletin 46-B

The only molten iron flux in SCORED BRICK FORM Saves time and labor in using.

You simply toss Famous Cornell Cupola Flux into cupola for each ton charge of iron or break off one to three briquettes (quarter sections) for smaller charges. Flux in this form does not blow out with the blast but STAYS in melting zone until entirely consumed, thus insuring fullest efficiency.



The CLEVELAND FLUX Company

1026-1036 MAIN AVENUE, N. W., CLEVELAND, 13, OHIO

Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze, Aluminum and Ladle Fluxes—Since 1918

FAMOUS CORNELL FLUXES
Trade Mark Registered

Write for Bulletins

Famous CORNELL ALUMINUM FLUX

Produces clean, tough castings. No spongy or porous spots even when more scrap is used. Thinner yet stronger sections are poured. Castings take a higher polish. NO FUMES! Exclusive formula prevents obnoxious gases. Metal does not cling to dross.

Famous CORNELL BRASS FLUX

Makes metal pure and clean, even when dirtiest brass turnings or sweepings are used. Produces castings which withstand high pressure tests and take a beautiful finish. Saves considerable tin and other expensive metals. Crucible and furnace linings are preserved.

Famous CORNELL LADLE FLUX

Place a few ounces in bottom of ladle, then tap cupola. Metal is thoroughly cleansed, foreign impurities are easily skimmed off. Ladles are kept clean, there is less patching and increased ladle life. Metal temperatures are retained during transfer to molds.

SEPTEMBER, 1948

THE FOUNDRY

VOLUME 76—NUMBER 9

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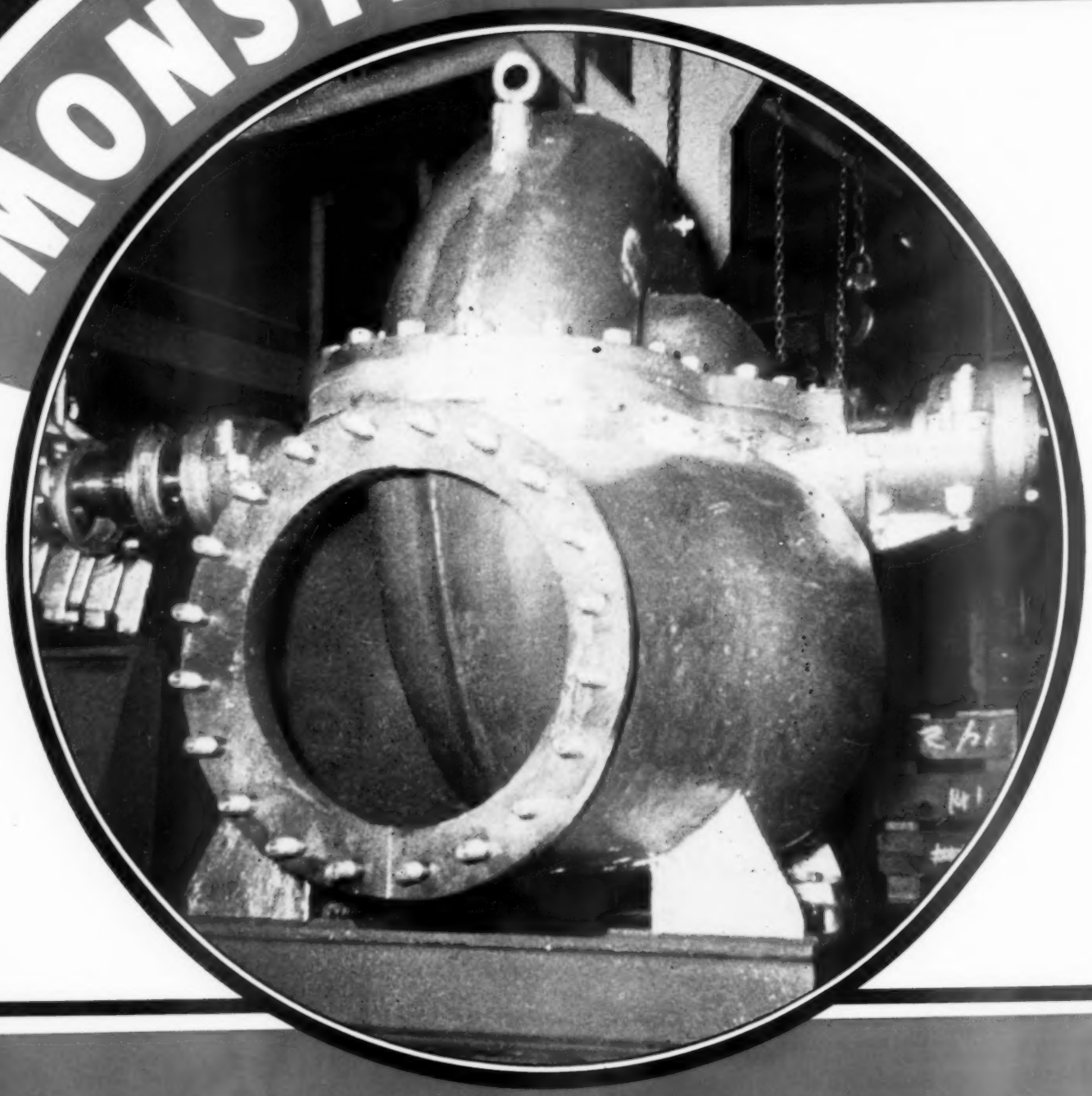
MONSTER PUMP—



THIS MONSTER HANDLES 8,500 GALLONS PER MINUTE!

A 20" Double Suction Pump cast by Hetherington and Berner, Inc., to specifications of the Dean Hill Pump Company. Steam Turbine Drive through a 7 to 1 reduction gear . . . pumps out 8,500 gallons per minute. LINOIL cored it!

CORED AND CAST IN LINOIL CORE MOLDS!

at

HETHERINGTON and BERNER, INC. INDIANAPOLIS, INDIANA

Typical of the large size jobbing work produced by Hetherington and Berner is this 20" Double Suction Pump—cored and cast in a dry sand mold. Here, LINOIL core molds saved the cost of a special-built flask for an unusual-size, small-order job. These huge, thick cores baked out evenly—right through to their centers—to assure a successful casting.

ONE OIL CORES MOST ALL JOBS "We make many kinds of castings with one or two oil-sand mixes, and we can always depend upon LINOIL to do the job properly", says Superintendent Louis Meyers. Fewer mixes simplify production . . . saving considerable time and labor.

NO LOSSES FROM CORE OIL VARIATIONS. Rigid laboratory control assures foundrymen of uniform, "fool-proof" performance from each drum of LINOIL . . . maintaining economy . . . and safeguarding production.

CORE MOLD for ONE-HALF of the Pump
A portion of the center core shows in the background. Upper right—Steam Jacketed Elbows—another Hetherington and Berner specialty—cored and cast in LINOIL core molds.

Cope half of pump center core

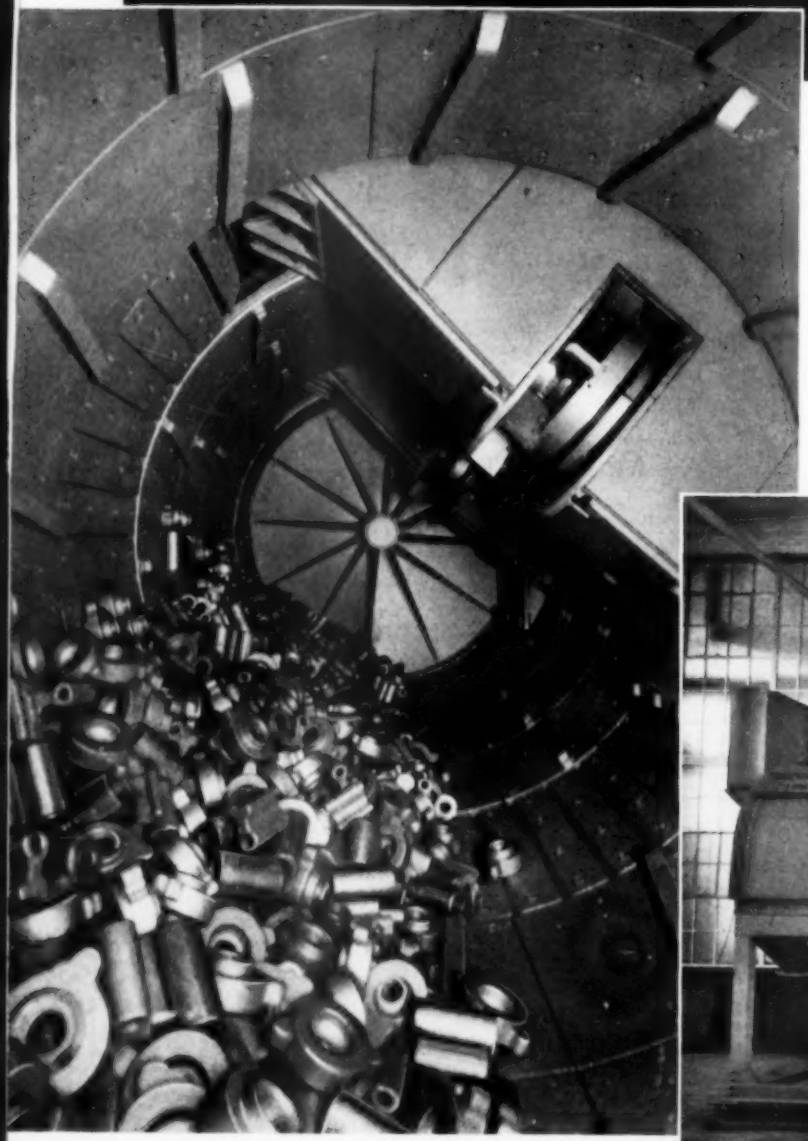
THE LINOIL — THE LOGICAL OIL

THE WERNER G. SMITH COMPANY
(DIVISION OF ARCHER-DANIELS-MIDLAND COMPANY)
2191 WEST 110th STREET • CLEVELAND 2, OHIO

Pangborn "Continuous-Flo"

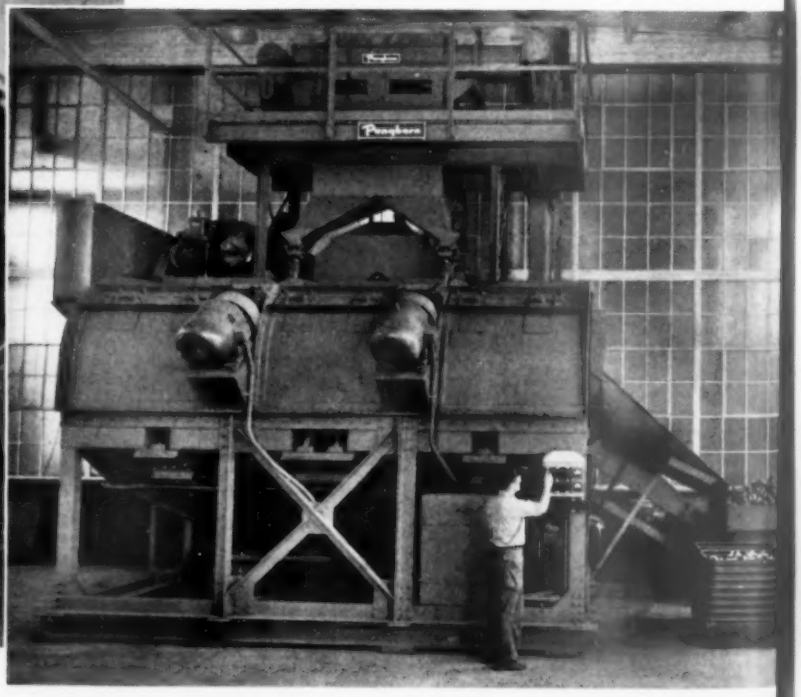
with only one man, cleans 312 tons

for COLUMBIA MALLEABLE CASTINGS DIVISION of GRINNELL CORPORATION COLUMBIA, PA.



LEFT—Looking into the New Pangborn "Continuous-Flo" ROTOBLAST Barrel from the feed end shows the castings as they tumble-flo through the abrasive streams.

BELOW—Here's the whole installation ... the newest, most revolutionary development in blast cleaning equipment ... Pangborn "Continuous-Flo" ROTOBLAST Barrel for a new low in cleaning costs.



Pangborn*

More Than 25,000 Pangborn Machines Serving Industry

o' ROTOBLAST* Barrel, on per day . . . at cost of 36¢ per ton

You saw the sensational "Continuous-Flo" ROTOBLAST Barrel at the Philadelphia AFA Show . . . Here's what it is now doing at Columbia:

1

Cleans MORE!

Cleans continuously 312 tons of assorted castings in 22½ hours . . . averages 13.8 tons per hour. One "Continuous-Flo" Barrel cleans all the work of 72 molding machines, 3 multiple pouring platforms.

2

Cleans FASTER!

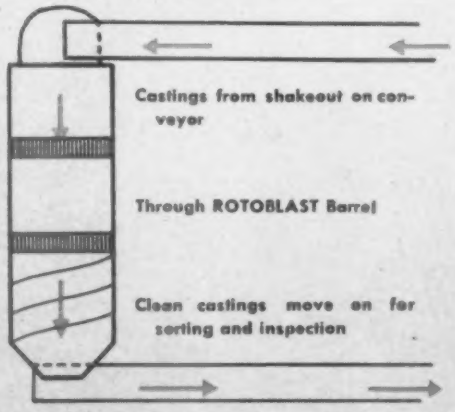
Castings are cleaned within 20 minutes after pouring—allowing quick inspection, thereby catching defects *early* and assuring better foundry control which results in *more good castings.*

3

Cleans CHEAPER!

ROTOBLAST cleans Columbia's castings for only 36c per ton. This is total cleaning cost—made up of labor, power, maintenance and abrasives.

HERE IT IS IN THE PRODUCTION LINE AT COLUMBIA



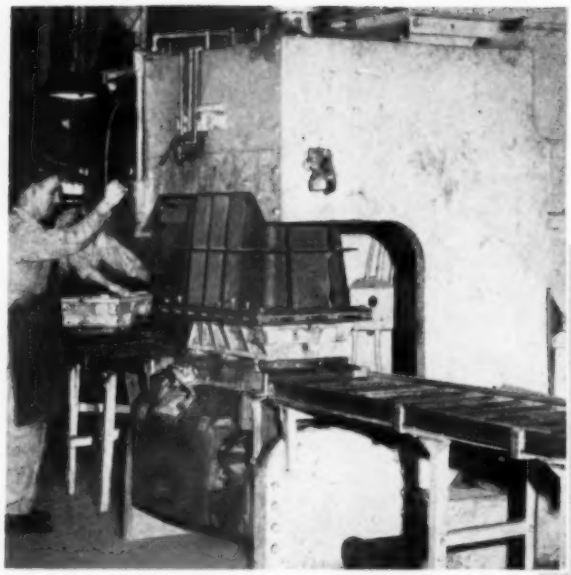
The RIGHT Equipment for EVERY Job

Castings at Columbia are untouched by human hands, from the moment they are poured, until they are ready for sorting and inspection. The Pangborn "Continuous-Flo" ROTOBLAST Barrel fits as an integral part of this modern, high-speed production line operation. After shakeout and cooling, Columbia's castings move, never stopping, on through the "Continuous-Flo" Barrel for ROTOBLAST cleaning, and out on the unloading conveyor for inspection and sorting . . . 20 minutes after they're poured!

*Trademark of the Pangborn Corporation

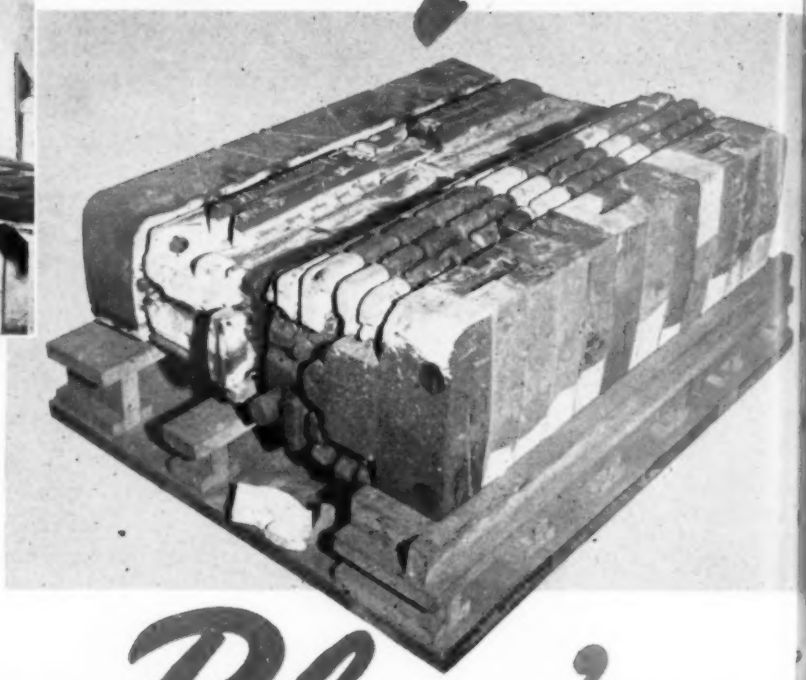
WRITE TODAY for complete details about the Pangborn "Continuous-Flo" ROTOBLAST Barrel. For all the latest developments in Blast Cleaning and Dust Control equipment — come to Pangborn. PANGBORN CORPORATION, 1400 Pangborn Boulevard, Hagerstown, Md.

BLAST CLEANS CHEAPER with the right equipment for every job



Seventeen pieces combine to form this 660-lb. core for International Harvester Diesel Engine casting. The largest sections, weighing nearly 60 lbs., are blown on the Champion CB-400, shown above.

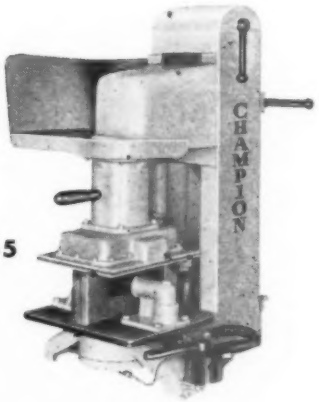
Big or



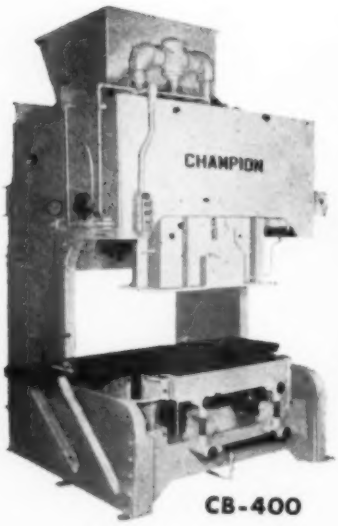
You can Blow 'em

How big did you say that core is? Never mind, there's a Champion Core Blower to handle it. Look at the line-up below, beginning with the daddy of them all, the CB-400, on down to "Junior", the CB-5, and whatever your requirements, one or more of these machines will fill those core boxes, and FAST! It takes no longer to blow 250 pounds of sand into a large core box on the CB-400, than to blow a gang of 2-ounce cores on the smallest model.

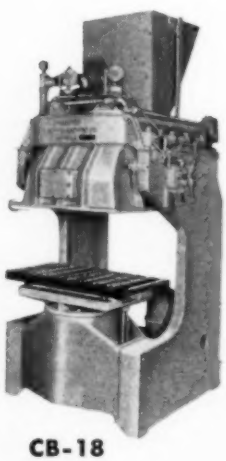
Try it yourself, and see!



CB-5



CB-400



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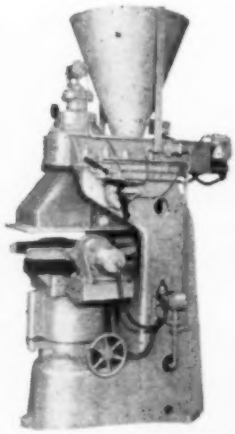
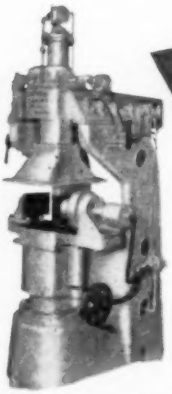


CB-15



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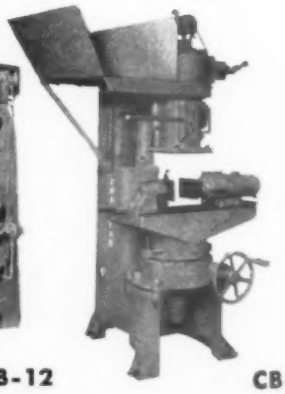


CB-10

Small-

Small, intricate shapes offer no problem when you blow them on a Champion. The cores and castings at the left, shown through courtesy of Federal-Huber, come out just as fast as the operator can manipulate the box and air lever.

ON CHAMPIONS!

Every Champion core blower, from the largest to the smallest, possesses every feature that gives every Champion its outstanding speed, safety and precision. Operators using Champion Core Blowers find their work easy to learn and pleasant to perform. All effort is supplied by the machine, the operator merely directs and controls it. Hence there is no fatigue to slow down production toward the end of the day.

Size of core has negligible effect on the speed of blowing, and Champions turn out such uniformly accurate pieces that even the largest sectional cores are assembled without jigging or grinding.

Champion engineering, based on a vast experience, has provided the strength, accuracy and simplicity of operation on every size Champion Core Blower, that makes them favorites with operator and management alike, in leading foundries the world over.

Champion engineers and production specialists are glad at all times to give you the benefit of their long experience in helping you solve any mold or core making problems. Champion molding machines, jolt squeezers, rollover and draw machines have the high productive capacity, the precision and ease of operation that make the big difference in profitable production. There's a place in any up-to-date foundry for Champion equipment. Let us show you what these efficient machines can do for you.

CHAMPION FOUNDRY & MACHINE CO.

GENERAL OFFICE AND PLANT, ROCKFORD, ILLINOIS

SALES OFFICE: 1553 W. MADISON ST., CHICAGO 7, ILL.

MOLDING MACHINES CORE BLOWERS

ELECTRIC RIDDLES

DELTA PARTEX NUT SHELL PARTING

SPEED CORE and MOLD PRODUCTION

DELTA PARTEX is a superfine, waterproofed powder made from selected pulverized nut shells. It contains no hazardous or harmful ingredients. It is safe and easy to use. It flows like water, dusts freely through the shaker bag and covers all surfaces uniformly.

DELTA PARTEX has the properties and characteristics of Lycopodium at only a fraction of the cost.

DELTA PARTEX works faster, saves time and lasts longer. Core boxes and patterns stay cleaner with fewer applications

DELTA PARTEX has uniform surface affinity for sand. It will not pile up in corners. It is non-reactive with molten metal and will neither pit nor etch metal pattern and core boxes. It will not contaminate or change the characteristics of core and molding sands.

DELTA PARTEX is EASIER, SAFER and MORE ECONOMICAL to use.

Ask for a liberal working sample for test purposes and prove to yourself the advantages of DELTA PARTEX in your foundry.

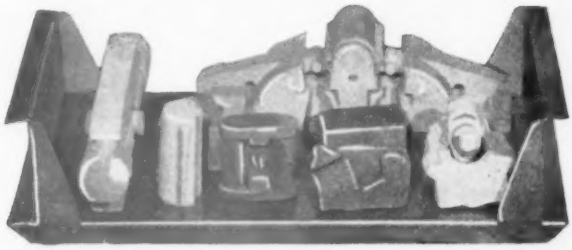
9 IMPORTANT REASONS WHY DELTA PARTEX IS MORE EFFICIENT AND MORE ECONOMICAL TO USE . . .

1. No silicosis hazard.
2. Has the properties and characteristics of Lycopodium.
3. Is non-reactive with molten metal.
4. Will not pit nor etch metal patterns and core boxes.
5. Will not contaminate nor reduce fusion point of core and molding sands.
6. Has uniform surface affinity for sand.
7. Leaves casting surfaces clean and free from contamination for plating work.
8. Is free-dusting through shaker bag.
9. Is moisture-resisting and will not deteriorate on aging.

DELTA OIL PRODUCTS CO.

MILWAUKEE 9, WISCONSIN

SAVE
EXTRA HANDLING!



USE CMD *DUAL-PURPOSE CORE TRAYS*

The CMD Dual-Purpose Core Tray can be used for baking the cores, thus eliminating transfer of cores from core plate to core tray.

Because of their lock-stacking features, these trays make possible storage from the floor up. Bins and racks are no longer necessary.

SPECIFICATIONS

SIZE—12" X 24"

LOADING HEIGHT—4½"—6" OR 7"

OVERALL HEIGHT—5½"—7" OR 8"

WEIGHT—9½ POUNDS

MATERIAL—16 GA. SHEET METAL

SPOT WELDED (28 POINTS)

ALL ROUNDED CORNERS

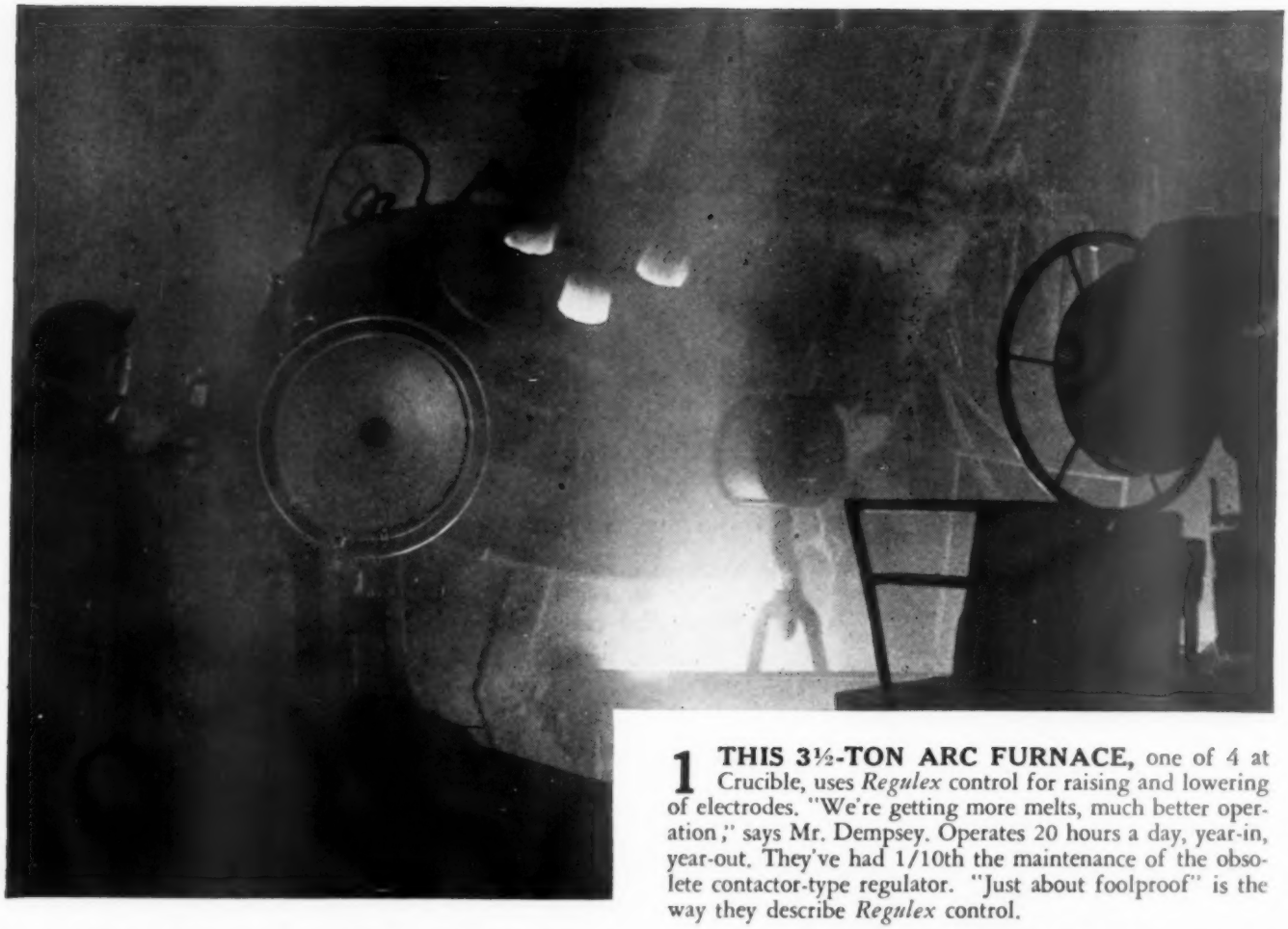
2 BOTTOM REINFORCEMENT ANGLES

CONSTRUCTED FOR STACKING

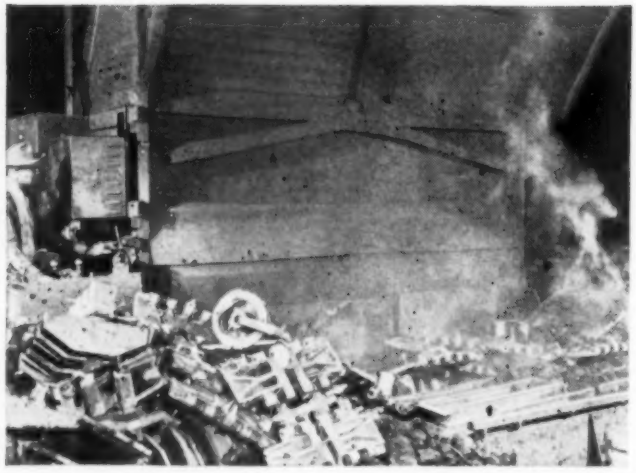
CHICAGO MANUFACTURING & DISTRIBUTING CO.

Dept. 5F, 1928 West 46th St. CMD Chicago 9, Illinois

"A-C Equipment



1 THIS 3½-TON ARC FURNACE, one of 4 at Crucible, uses *Regulex* control for raising and lowering of electrodes. "We're getting more melts, much better operation," says Mr. Dempsey. Operates 20 hours a day, year-in, year-out. They've had 1/10th the maintenance of the obsolete contactor-type regulator. "Just about foolproof" is the way they describe *Regulex* control.



4 "A-C" DOESN'T MEAN ONLY ELECTRICAL! This huge dual-drive 8 by 10 foot Allis-Chalmers shakeout has been operating 18 hours a day since 1943; shakes out up to 2200 lb. rough steel castings. Average output is 90-100 tons for 8 hour day, though they can go considerably higher if necessary. Drives are "A-C" too — two 15 hp, totally-enclosed motors and *Texrope* drives!

5 30 TO 60 TONS of broken core sand goes over this *Low-Head* vibrating screen each day. It's designed to operate horizontally, saving both headroom and space. All welded parts are stress-relieved for added strength; and vibrating mechanism imparts uniform vibratory motion to the screen body. Crucible's policy, as Mr. Dempsey has put it, is to "Keep ahead" . . . and they sure practice it!

Stands Up!"

—Mr. A. Dempsey, Gen. Mgr. Crucible Steel Castings, Milwaukee

Crucible Steel is one of the Most Highly Mechanized Steel Foundries in the Middle West — with a Capacity of 2000 tons per Month, Castings from 1 Pound to 10 Tons. And they're Not Stopping there! Read below how Modern, Mechanized Equipment of the kind Allis-Chalmers Builds, Keeps Crucible Ahead in Foundry Production!

2 IN ADDITION TO *REGULEX* CONTROL for this furnace, Crucible has 4 A-C furnace transformers, 3 complete, solenoid-operated A-C oil circuit breakers for arc furnaces alone! Here's "Casey" Michalak, Chief Electrician, looking over a 2500 kva furnace transformer, switchboard, *Regulex* control, 15 kv oil circuit breaker and current transformers — all Allis-Chalmers!

3 LOCATED RIGHT AT LOAD CENTER, this 13,200 volt unit-substation distributes to power and lighting transformers. "Casey" says biggest enemy of electrical equipment is dust; uses time-table maintenance as a solution. Any continuously-running equipment looked at once a day; crane motors once a week. Transformer oil test every 3 months. Every 2 weeks breakers checked.

6 IT PAYS TO DEAL WITH THE COMPANY that builds a wide line of quality equipment! Other examples at Crucible are this 210 hp synchronous motor for air compressor; an m-g set; and an "A-C" booster pump in their dust control system. Yes, it pays to buy the equipment that pays for itself . . . for in foundries, as in every industry, "A-C equipment stands up!"

* * * * *

An experienced Allis-Chalmers representative will be glad to go over your foundry requirements with you. Consult your nearby A-C district office, or write ALLIS-CHALMERS, MILWAUKEE 1, WIS. A 2484

Regulex, Texrope and Low-Head are Allis-Chalmers Trademarks

For Bigger Output . . .
Better Working Conditions . . .
Mechanize with

ALLIS-CHALMERS

Pioneers in Power and Electrical Equipment — Biggest of All in Range of Industrial Products

8 A.M. EFFICIENCY

maintained **ALL DAY**
with **ORTON**

ONE-MAN

AERO-CRANE

POWERMATIC AIR-CONTROL

No Afternoon Fatigue Let-Down

One Man, with the Powermatic Air-Control Orton Aero-Crane loads and unloads cars, trucks, gets material onto the stockpile and off with *early-morning* efficiency *all day.*

Effortless Orton air-control enables one man with the Aero-Crane to handle 200 to 1000 lb. loads that eat up the time of a yard crew. Aero-Crane pays for itself in saved man hours.

Designed to SPEED Yard Work

Orton one-man Aero-Crane travels rapidly job to job with boom in any position.

Insures SAFE lowering of heavy loads against *compression of the engine.*

Full-view cab. Full circle turntable. Anti-friction bearings. Non-burn Orcoin V-type clutches. SAFETY spring-applied, air-released hoist brakes. Electro-welded construction.

Eight models, 3,500 to 60,000 lbs. capacity. Diesel or gasoline powered.

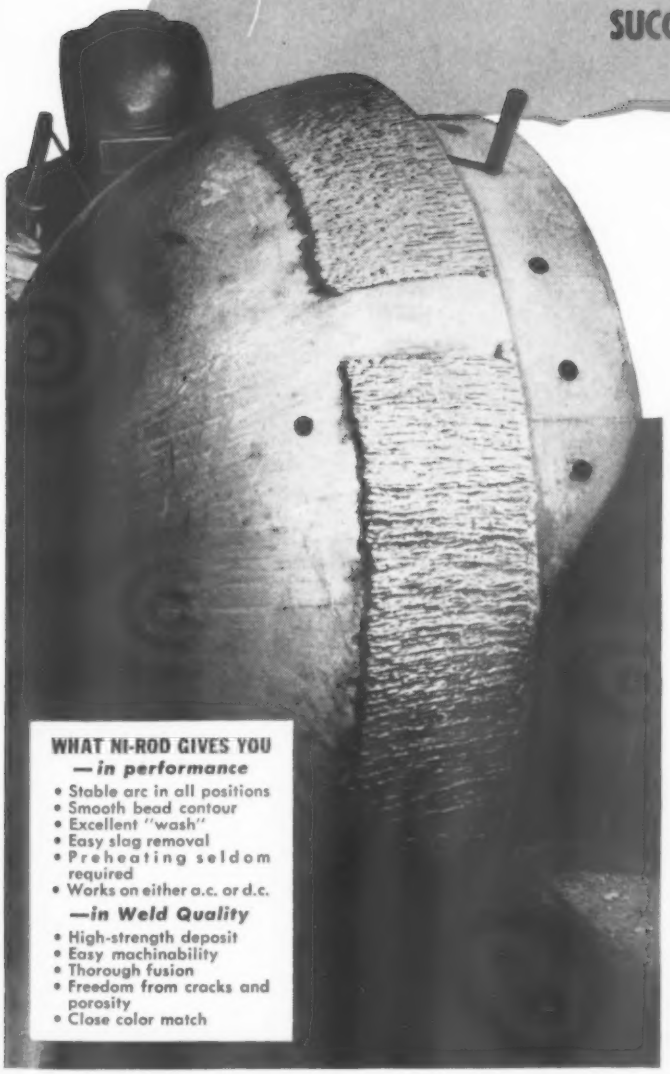
Send for Catalog 73-B for full details and roster of Orton world-wide users

◄ Long-life Orton Aero-Crane has most rigid car body of any crane built. Goes anywhere a truck will go. Operated, traveled and steered from craneman's seat.

ORTON CRANE & SHOVEL COMPANY
608 South Dearborn Street, Chicago 5, Illinois

If it's CAST IRON you can weld it with NI-ROD

NI-ROD WELDING ELECTRODES SUCCESSFULLY BUILT UP THIS WORN DIE



WHAT NI-ROD GIVES YOU

— in performance

- Stable arc in all positions
- Smooth bead contour
- Excellent "wash"
- Easy slag removal
- Preheating seldom required
- Works on either a.c. or d.c.

— in Weld Quality

- High-strength deposit
- Easy machinability
- Thorough fusion
- Freedom from cracks and porosity
- Close color match

Dished heads are just one of the products of Lukens Steel Company, Coatesville, Pa.

They're formed with large hemispherical dies. Dies made of cast iron. Dies that are fairly expensive. When one wears down, Lukens' maintenance men try to restore the original contours.

For several years Lukens had used brazing to build up the worn areas. Then they tried Ni-Rod* welding electrodes because of good reports on its strength and easy machinability.

Here's what Lukens has to say about this repair job:

> **"With other wires, it was found that welds would pull loose from the casting when in use. Ni-Rod was the only electrode that could be used successfully. It would not pull loose when in operation, and had a very good wearing quality. We now use Ni-Rod for building up dies to insure good wear and where pressure on the die is involved."**

The welded die (before machining) is shown at the left. Note the smooth layer of Ni-Rod beads. Proof of Ni-Rod's easy handling!

Time and time again, Ni-Rod can save you money in repairing damaged iron castings; in building up worn areas; in correcting machining errors; on the production line to join cast iron to steel.

*Reg. U. S. Pat. Off.

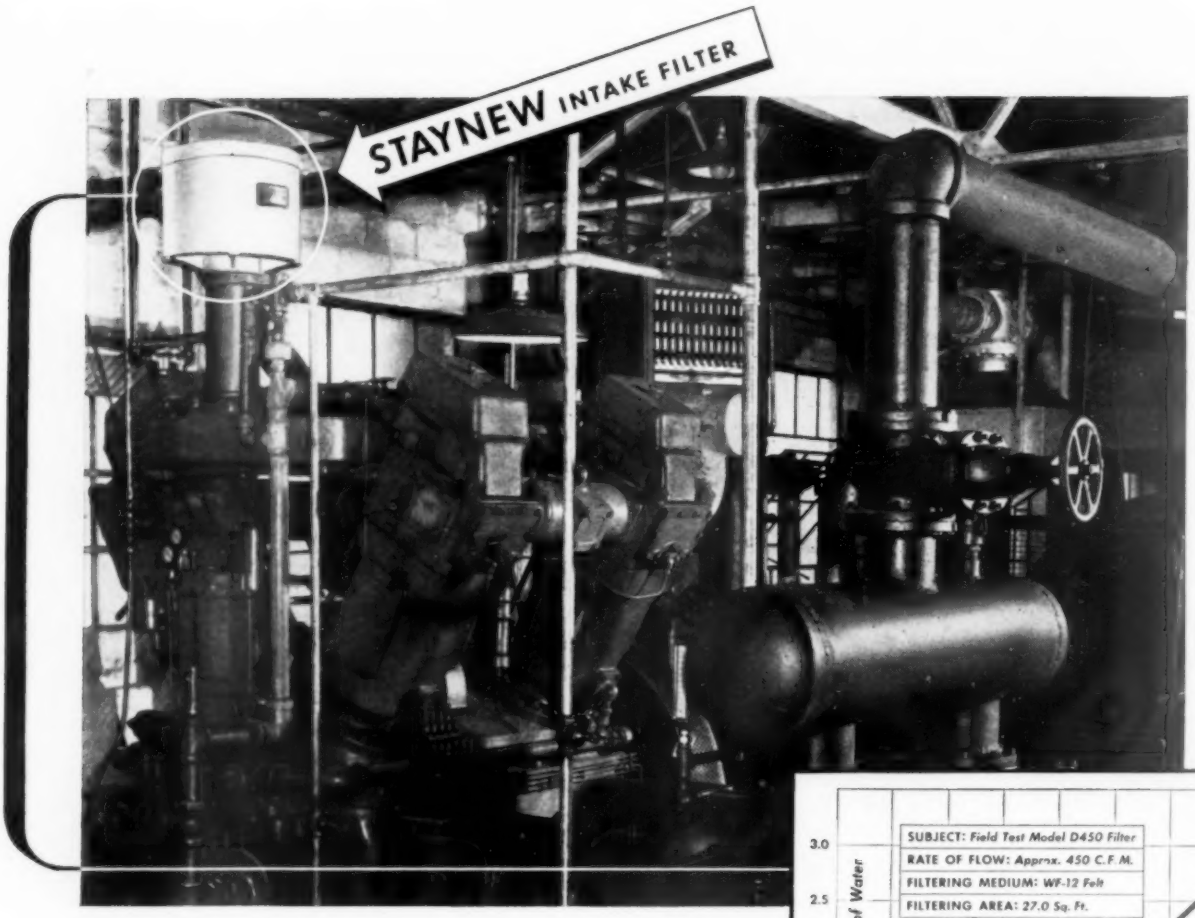
EMBLEM OF SERVICE

INCO NI-ROD TRADE MARK

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

GET NI-ROD FROM:

Whitehead Metal Products Company, Inc.
Steel Sales Corp. — Williams and Company
Pacific Metals Company, Ltd. — J. M. Tull Metal & Supply Co.
Eagle Metals Co. — Metal Goods Corporation
Robert W. Bartram, Ltd. — Alloy Metal Sales, Ltd.
Wilkinson Company, Ltd. — Metal & Thermit Corporation
Hollup Corporation — National Cylinder Gas Company



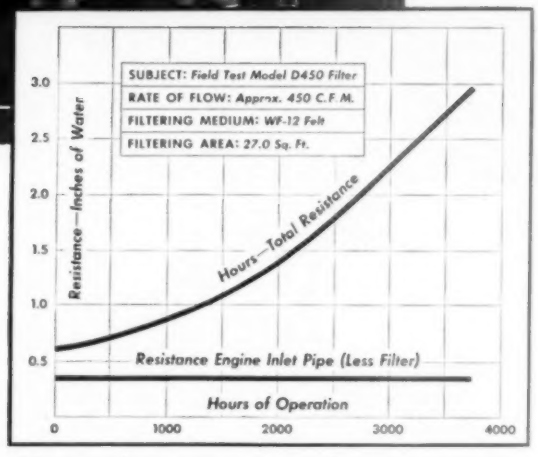
3761 HOURS CONTINUOUS OPERATION WITHOUT ATTENTION

Yet Filter Resistance Is Only 2.73 Inches of Water

This filter, installed on a Diesel-powered compressor, operates under unusually severe conditions. Intake air is heavily loaded with dust and oil; the dust due to the close proximity of a railroad siding where bulk lime, sand, and coal are handled—the oil to two additional Diesel-powered compressors operating in the same room.

Such a case history is not unusual. Reports are frequently received of Staynew Filters operating under less severe conditions for two or more years without attention—with the initially high efficiency rising as dust load increases.

Ease of cleaning as well as infrequency of cleaning is also an important feature, requiring only a few minutes with the specially designed Staynew Cleaning Nozzle.



More and more experienced operators of compressor and engine equipment specify Staynew Intake Filters—not only because of the minimum attention required, but also because these filters:

- ★ **Provide positive protection**
- ★ **Require no pre-coat or filter aid**
- ★ **Are unaffected by extremes of temperature**
- ★ **Permit use of oversize filters (air velocity not critical)**
- ★ **Are ideal for use with carbon ring compressors**

DOLLINGER PROTECTO-MOTOR STAYNEW FILTERS

DOLLINGER CORPORATION

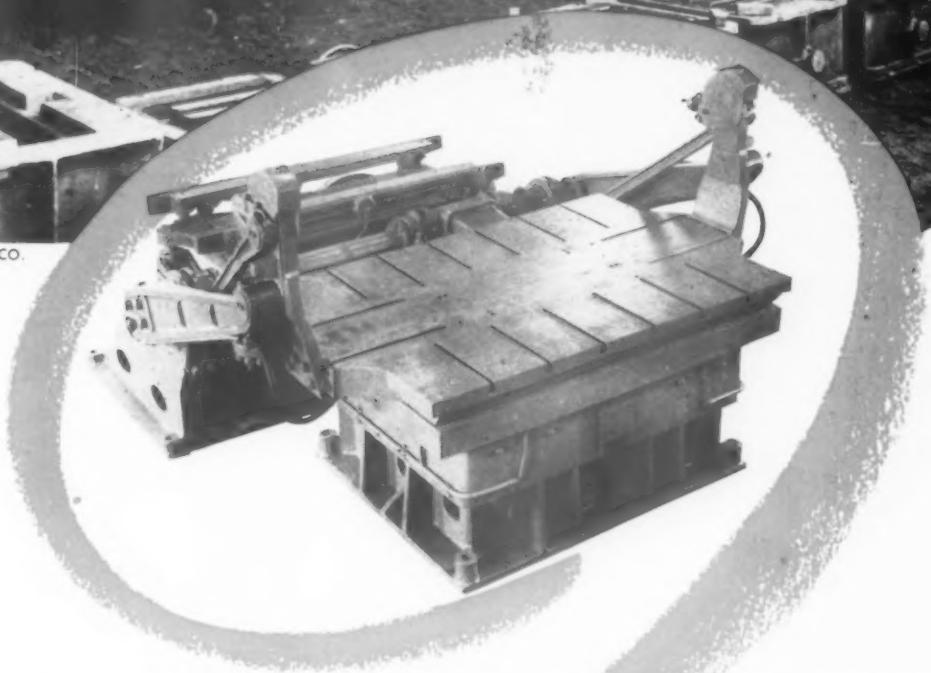
36 CENTRE PK., ROCHESTER 3, N. Y.

Representatives in Principal Cities

This Foundry Is A Good Place to Work

CHICAGO PNEUMATIC TOOL CO.

MEMBER

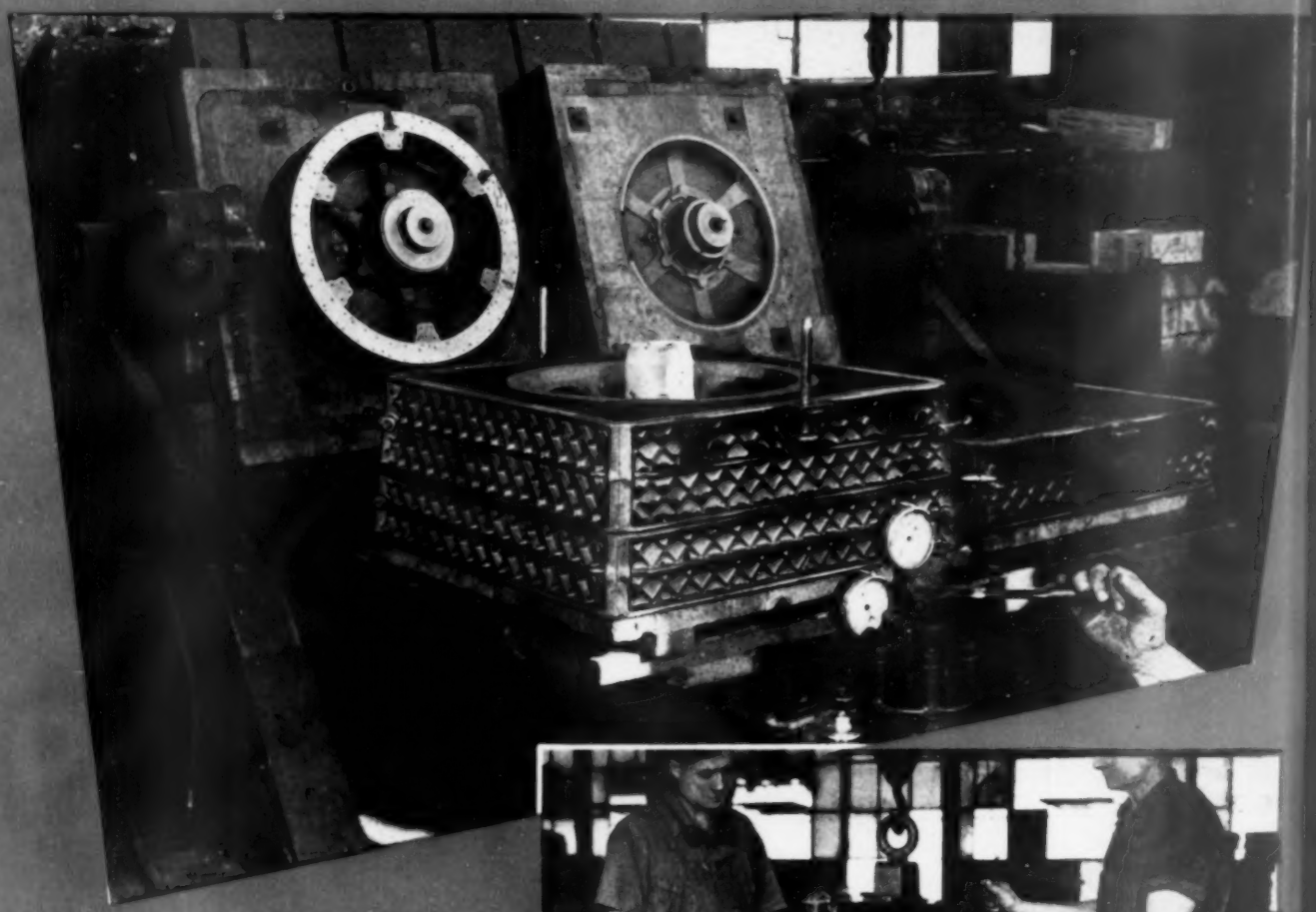


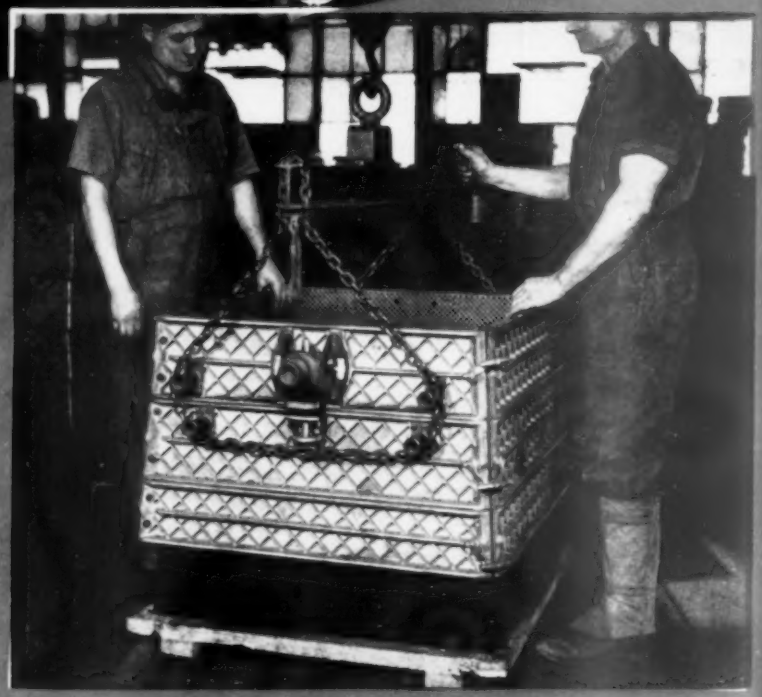
This foundry at Franklin, Pa., has pursued a policy of progressive thinking and continuing modernization since its start over a half century ago. Its hundreds of products range from air compressors to yoke riveters. It is a good place to work for several reasons: Large continuous windows provide ample light and ventilation; modern equipment; great stress is placed on safety; alterations, changes and improvements are going on constantly; dust collection, sand handling and conveyor equipment.

Also, the plant uses a battery of Herman molding machines, ranging in capacity from 1500 lbs. to 20,000 lbs. The Herman machine illustrated has a rollover capacity of 10,000 lbs. and incorporates the world-famous ruggedness that is typical of all Herman machines. Your attention is called to the jarring machine base which has the same approximate dimensions as the table plate. This outstanding feature eliminates the possibility of the table plate vibrating during the jarring operation and reduces wear at the cylinder and plunger to an absolute minimum. Features include automatic timer; simple operation; one control valve. Can we tell you more about the Herman? Write us today.

HERMAN MOLDING MACHINES

HERMAN PNEUMATIC MACHINE CO. • UNION BANK BUILDING • PITTSBURGH, PA.





HINES
POP-OFF
(Trademark Reg. U. S. Pat. Off.)
FLASK

THE HINES

3431 WEST 140th ST.

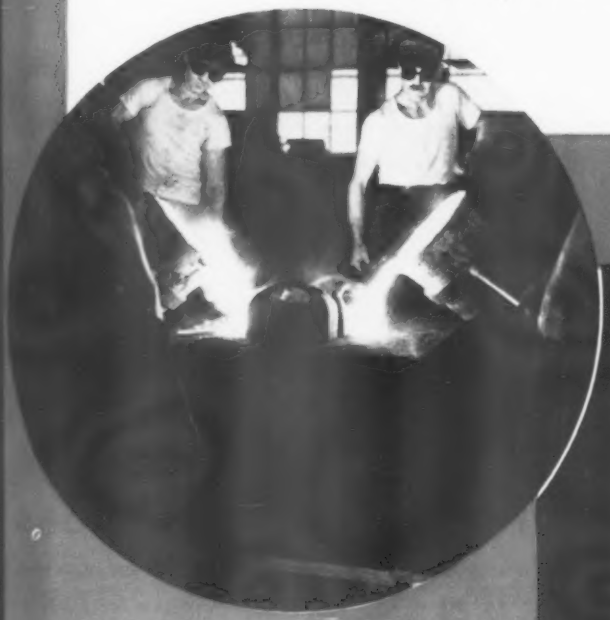
Another Good Example of

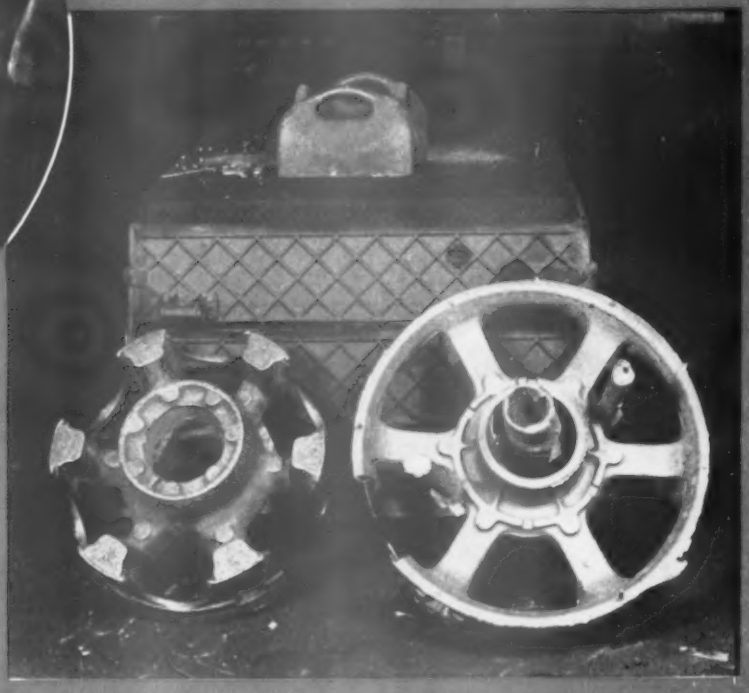
Large, Heavy Castings Being Made in

HINES *"Pop-Off"* FLASKS

and poured off in

HINES JACKETS





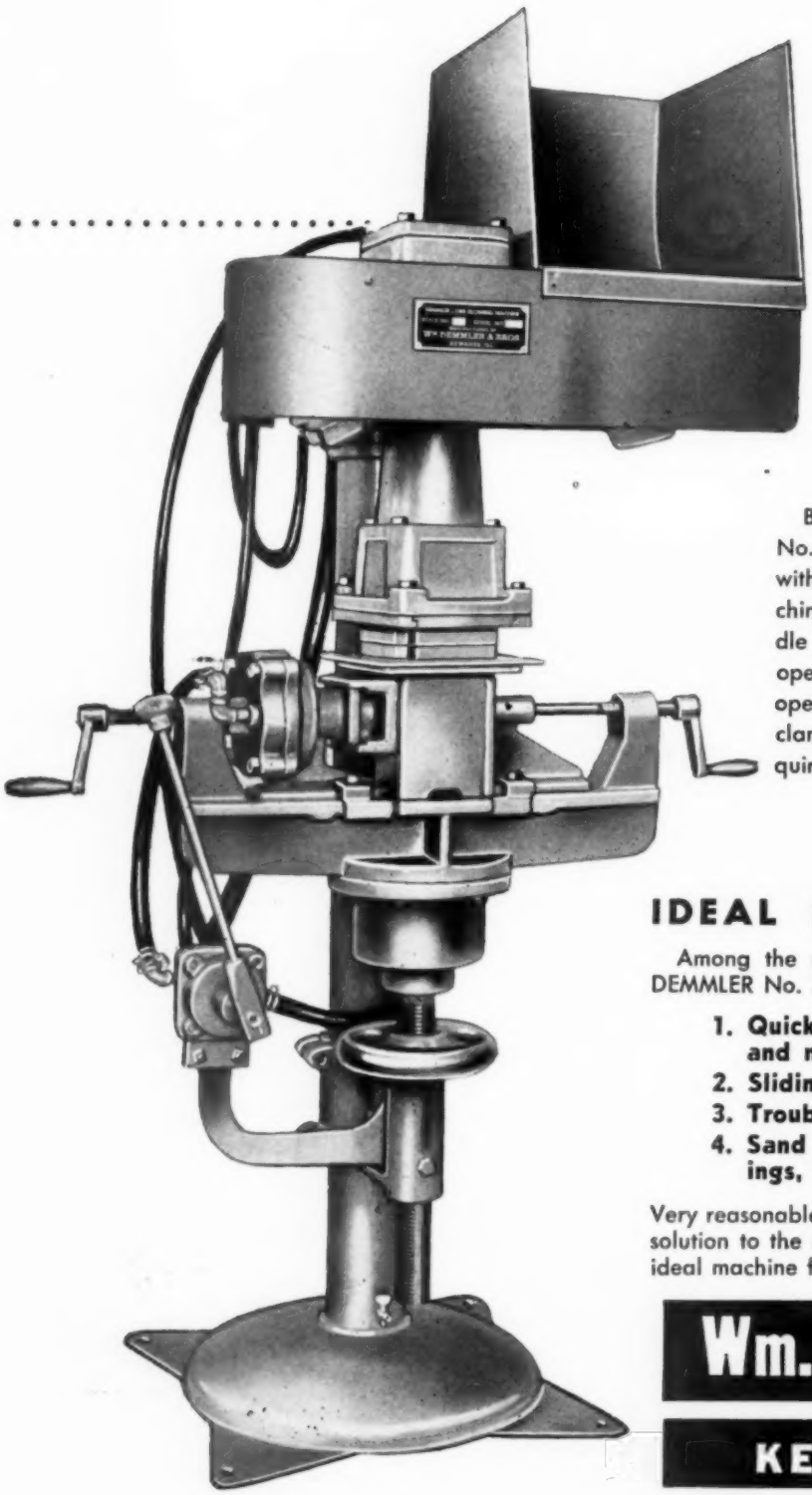
All Hines Flasks and Jackets are fully protected by patents and patents pending.

SFLASK CO.

CLEVELAND 11, OHIO

DEMMLER Core Blower

NO. 55



A FAST CORE BLOWER EVERY FOUNDRY NEEDS AND CAN AFFORD

Because of its many features, the new Demmler No. 55 Core Blower was quick to gain popularity with foundrymen everywhere. This versatile machine will accommodate boxes 9 inches long—handle cores weighing up to 3 pounds. Sand magazine opening is 4½ by 9½ inches. A single hand valve operates both vertical and horizontal core box clamps and blows the core. Only 3 seconds required for complete cycle!

IDEAL FOR SHORT RUN JOBS

Among the many high quality features found on the new DEMMLER No. 55 are:

1. **Quick, easy adjustments for raising the table and moving chuck jaws.**
2. **Sliding, quick change blow plates**
3. **Trouble-free diaphragm type blow valve**
4. **Sand magazine and carriage of aluminum castings, with ball bearing rollers**

Very reasonable in price, the DEMMLER No. 55 is the economical solution to the rapid production of high quality small cores—an ideal machine for any foundry whether large or small.

Wm. Demmler & Bros.

KEWANEE, ILLINOIS

SEND FOR ILLUSTRATED SPECIFICATION SHEET

Pick your PROTECTION to PERFECTION!

AO 700
RUBBER FRAME GOGGLE
PROTECTS AGAINST CHEMICAL AND DUST HAZARDS . . .

AO 705
SUPER VENT GOGGLE
PROTECTS AGAINST FOGGING AND STEAMING ALSO

These two NEW Goggles are identical except for the special nosepiece and inhalation and exhalation valves on the 705 which operate to prevent fogging and steaming in hot, humid working conditions. Each goggle is designed for the greatest possible protection and comfort — each features a large shatter-resistant single acetate lens which can be *easily replaced*, and WIDE ANGLE VISION.

The all-rubber frame molded to conform to face contours provides an airtight, dust-tight fit. While the 705 is recommended for severely hot and humid operations, the 700 provides ample ventilation in normal atmospheres. A filter element under the perforations at top and sides of the goggle blocks acid and dust from the eye area. Headband is comfortable and adjustable.

The 705 Super Vent Goggle operates by air sweeping through a chamber when wearer inhales, thus removing moisture on the inner lens surface before fogging can begin. When exhaling, inlet valve closes and moist air escapes through exhalation valve. Your AO Safety Representative can supply you with the right goggle for your needs.

American Optical COMPANY — *Safety Division*

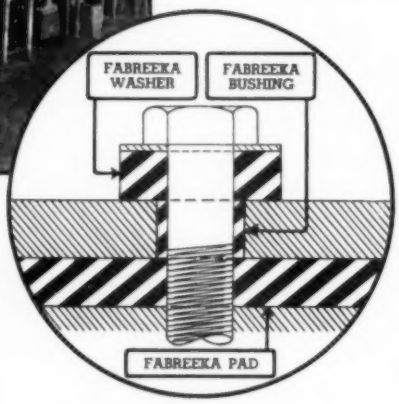
SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

Under All Heavy Machinery

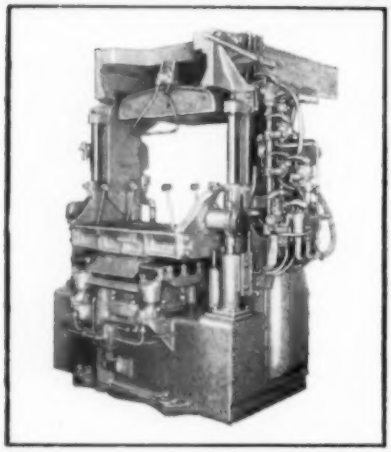
FABREEKA

PADS, BUSHINGS, and WASHERS

Absorb Impact Shock and Reduce the Effect of Destructive Vibration

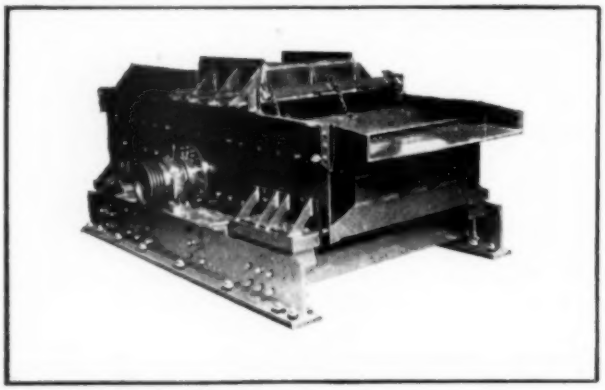


SHOWN AT LEFT
CROSS SECTION OF
FABREEKA INSTALLATION



FABREEKA Pads, bushings, and washers are installed under Shakeout Machines, Jolt Moulders, Tumbling Barrels and other heavy machinery to reduce the effects of heavy impact shocks and destructive vibration.

FABREEKA has demonstrated its ability to prevent breakage of machine parts and to keep bolts tight, thereby reducing maintenance and increasing production. In addition to these important advantages, Fabreeka has long life, which makes its final cost a low cost.



Write for latest literature

It Pays To Specify Fabreeka

FABREEKA PRODUCTS COMPANY, INCORPORATED
222B Summer Street
Boston 10, Mass.

for IMPACT SHOCK and VIBRATION

When You Need VANADIUM

Product and Analysis	Form and Packaging	Uses
Ferrovanadium **High-Speed Grade** Vanadium—50 to 55% Silicon —1.50% max. Carbon —0.20% max.	Lump (10 lb. x down) and crushed (2 in. x down, and 1 in. x down). Packed in special containers.	Production of tool steels, engineering steels, high-strength structural steels, non-aging rimming steels, and special wear-resistant cast irons. Frequently used in combination with other alloying elements.
Special Grade Vanadium—50 to 55% Silicon —4.00% max. Carbon —1.00% max.	Crushed (2 in. x down, 1 in. x down, and 20 mesh x down). Packed in special containers.	
Open-Hearth Grade Vanadium—50 to 55% Silicon —8.00% max. Carbon —3.00% max.	Lump (10 lb. x down) and crushed (2 in. x down, 1 in. x down, ¼ in. x down, and 65 mesh x down). Packed in special containers.	
Vanadium Oxide (Fused) Vanadium Oxide (V_2O_5)—86 to 89% Sodium Oxide (Na_2O) —10% approx Calcium Oxide (CaO) — 2% approx.	Black flaky material. Packed in paper-lined burlap bags containing about 60 pounds net.	Direct reduction in steelmaking furnaces, as in production of tool steels.
Vanadium Oxide (Red Cake) Vanadium Oxide (V_2O_5)—85% approx. Sodium Oxide (Na_2O) — 9% approx. Water (H_2O) —2.5% approx.	Red sand-like material. Packed in paper-lined burlap bags containing about 60 pounds net.	Source of vanadium oxide, catalyst for sulphuric acid manufacture, and for organic synthetic reactions. Color constituent in glass and ceramic glazes. Drier in paints and inks.
Vanadium Oxide (High Purity) Vanadium Oxide (V_2O_5)—99% approx.	Tan crystalline material.	Chemical for laboratory research.
Ammonium Metavanadate Ammonium Metavanadate (NH_4VO_3)—99% min.	White crystalline powder. Packed in 13-gallon capacity fiberboard drums.	Source of pure vanadium compounds used principally as catalysts. Intermediate in manufacture of vanadium compounds used for coloring ceramic glazes and glass, and for paint and ink driers.

Write, Wire or Call

ELECTRO METALLURGICAL SALES CORPORATION

Unit of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

OFFICES: Birmingham • Chicago • Cleveland • Detroit
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Electromet
TRADE-MARK
Ferro-Alloys and Metals

In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

Turn in your scrap promptly and help increase steel production

Spotlighting

AN "IMPOSSIBLE" DIE CASTING JOB

To get the surface smoothness required for flawless electroplating, stamping the head sections of automobile spotlights from brass is the accepted practice—in spite of high die costs, scrap loss and expensive second operation machine work.

The Standard-Thomson Corp., Dayton, Ohio, prime contract supplier of spotlights for a leading automobile manufacturer, continued investigating the possibility of *die casting* these head sections, although other lamp manufacturers considered it impractical. Die cast surfaces couldn't take the smooth, high-chrome finish required for automotive accessories, they said.

But take a look at the zinc head section castings now flowing from Standard-Thomson's new Model 400 Cleveland. Fully automatic timed operation averages *144 perfect shots per hour!* Cleveland's "squeeze to the shot" produces *hardware finish* castings which require only buffing before plating. Machining costs, metal costs and die costs are down—production is high.

If you're considering new die casting machinery—or *changing* to die castings—profit from the experience of others and consider Clevelands *first!* Let a Cleveland engineer show you the advantages. For complete machine specifications, write now for bulletins.

Remember *Clevelands Cut Costs*

THE CLEVELAND AUTOMATIC MACHINE COMPANY

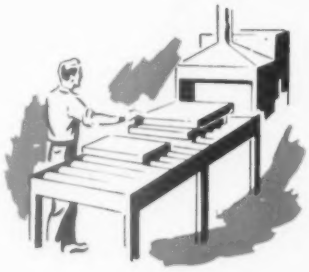
4926 BEECH STREET • • CINCINNATI 12, OHIO

CHICAGO (6) 3710 Civic Opera Bldg. CLEVELAND (14) 1114 NBC Bldg. DETROIT (2) 540 New Center Bldg.
HARTFORD (1) 529 Capital National Bank Bldg. NEW YORK (6) 2402 Singer Bldg.

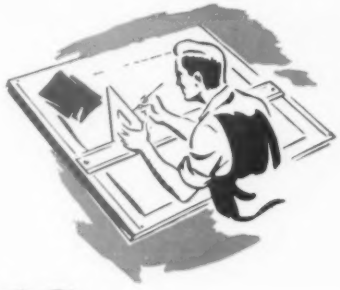
This typical G-E "Packaged Process" includes two roller-hearth electric furnaces, protective atmosphere producers, control equipment, and conveyor system—for annealing malleable iron castings.

Wrap up your heating process in a *G-E "Package"

Here's the complete, economical answer to industrial heating problems—General Electric "Packaged" Heating Processes. Designed to do the *entire* job, a G-E "Packaged Process" provides you with a single source of supply for all of the following:

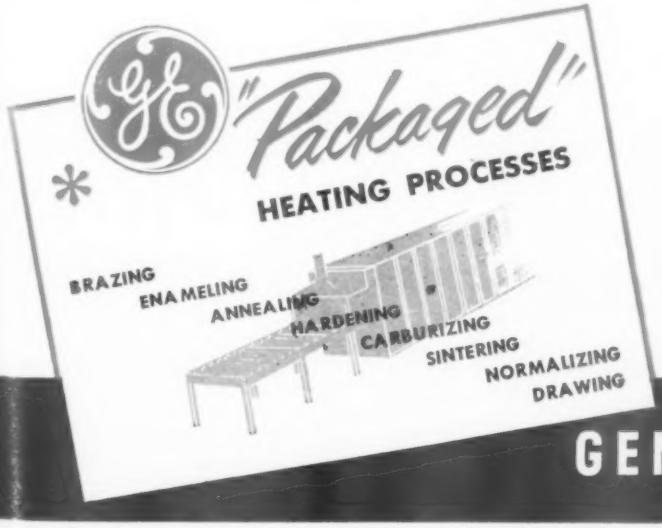


EQUIPMENT—A G-E "Packaged Process" combines one or more furnace units from the outstanding G-E electric furnace line—roller-hearth, mesh-belt, elevator, pit, car-bottom, etc.—with appropriate G-E protective atmosphere producers, automatic controls, conveyers, and handling equipment. This "process packaging" of G-E equipment assures maximum performance through proper coordination of every component . . . eliminates "misfits" . . . saves you time and expense.



ENGINEERING—Your process becomes the "focal point" for applying all of General Electric's 40 years' experience in designing, manufacturing, and applying industrial heating equipment. Expert G-E engineers advise and plan right with you from start to finish.

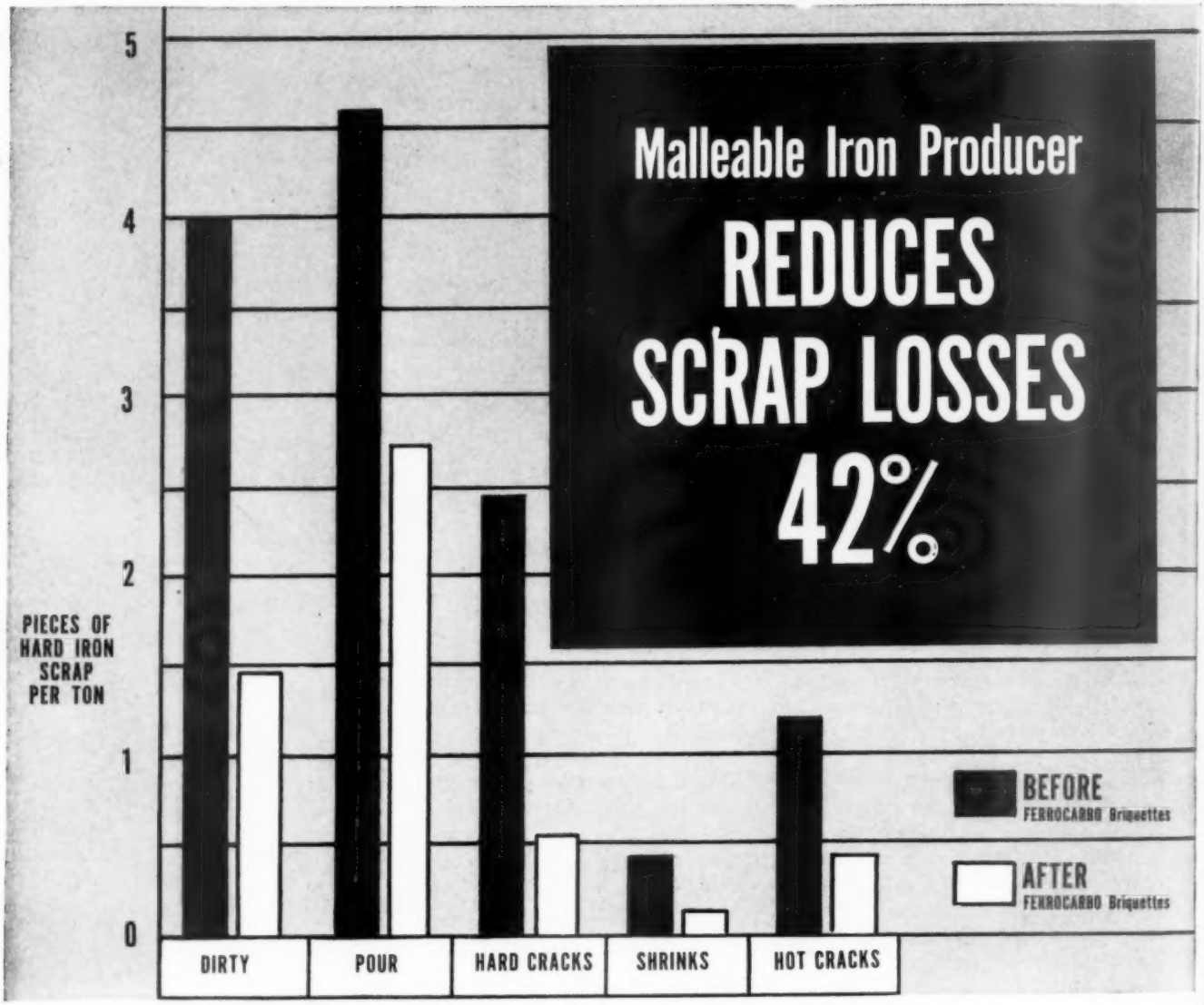
FIELD SERVICE—G.E.'s nationwide field service stands ready to supervise your installation, help solve operating problems, and to perform emergency repairs at any time.



Contact the heating specialist in your nearest G-E office for additional information on G-E "Packaged" Heating Processes (or for information on electronic heaters and small heating devices); or, write *Dept. 675-177, Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

675-177



Using FERROCARBO briquettes in the charge, a large producer of duplex cupola-air furnace iron reduced scrap, due to metal defects by 42%. The reduction in scrap, due to all causes, amounted to 19.3%; while *the overall yield,* figured by dividing the total melt into the weight of good hard iron castings, *was increased by* 9.4%. These figures are based on scrap loss records compiled over a two month period and charted here. These results are particularly illuminating when it is realized that they chart defects attributed to metal composition and melting practice only.

Because FERROCARBO briquettes, used in the charge of the cupola in the malleable industry, can reduce scrap losses and produce an increase in overall yield... their use is worth investigating. Our metallurgical staff can furnish complete detailed information. Call them in and talk it over. There's no obligation, of course.

FERROCARBO Briquettes

BY CARBORUNDUM

TRADE MARK

THE CARBORUNDUM COMPANY, Abrasive Grain and FERROCARBO Division, Niagara Falls, New York

FERROCARBO Distributors: Kerchner, Marshall & Co., Pittsburgh, Cleveland, Birmingham, Philadelphia and Buffalo; Miller and Company, Chicago, St. Louis and Cincinnati

"Carborundum" and "Ferrocarbo" are registered trademarks which indicate manufacture by The Carborundum Company

RIGHT DRILLS CUT COSTS 50%

THIS manufacturer of road building equipment drills hundreds of 3/16" holes in a cab frame, using universal electric drills with a load speed of about 2000 R.P.M. Drilling was slow because of bulk of the tool.

The Rotor Application Engineer suggested a light-weight, 4000 R.P.M. Rotor Air Drill. Results:

Easy handling. Tool weighs only 1 lb.-10 oz. —is easy to maneuver. Side-to-center distance of tool is only 1 3/16"—makes it easy to get at hole locations.

Twice as fast. Higher speed under load gets out more work. On this job, it cuts drilling cost in half.

There's no obligation for a study of *your* operations to make similar improvements.

AIR O'TOOL

Fast, Smooth Cutting A

g Action *plus* Long Life-

NORTON B-5 and B-7 RESINOID Wheels Give You *Both*

HERE'S a sure way to help hold down soaring production costs! Put these cost-cutting Norton Resinoid Wheels to work on your high speed foundry grinding jobs. They really do cut fast and smooth, *without* sacrificing wheel life.

B-5 Resinoid Bond is popular for wheels in the soft and medium-hard range, while B-7 Resinoid Bond, a stronger and more heat-resistant bond, is designed for wheels in the harder grades.

Both of these outstanding resinoid bonds are available with Norton Alundum and Crystolon abrasives, and you'll find a wheel of exactly the right combination to provide the fast, economical results you're after.

Why not reduce costs *now* on cleaning room grinding jobs? Contact your Norton abrasive engineer or distributor for specific wheel recommendations.

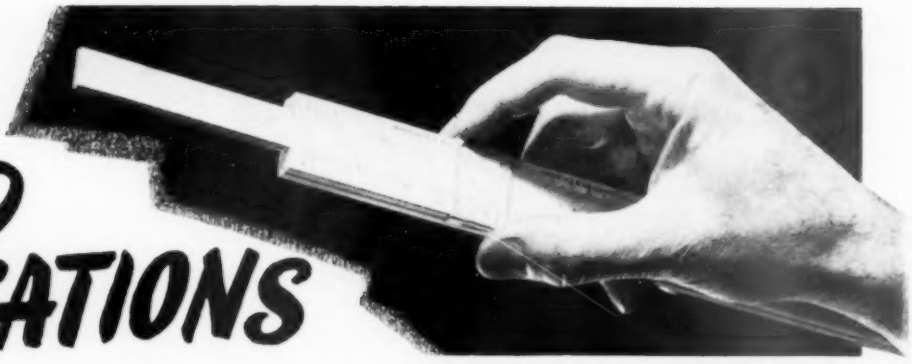
NORTON COMPANY • WORCESTER 6, MASS.

Distributors In All Principal Cities

W-1159

NORTON ABRASIVES

Built TO RIGID SPECIFICATIONS



There's a STERLING STEEL FLASK For Every Molding Requirement

Whether you need small or large foundry flasks, there are Sterling Steel Flasks to meet your specific job requirements. Every Sterling is constructed to give you a maximum of strength with minimum weight. Even under rough usage, you are assured of obtaining both accuracy and speed in molding. This is possible only because Sterling Steel Flasks are built to rigid specifications according to modern engineering design. They are backed by more than 40 years experience fabricating quality foundry flasks.

TINY BUT TOUGH!

The Sterling Style "S" Steel Flask is designed for tough, small and medium sized work. It is especially popular in brass and iron foundries. Available with interchangeable copes and drags having depth of 2½" and up. Built with combination pin lugs and handles.

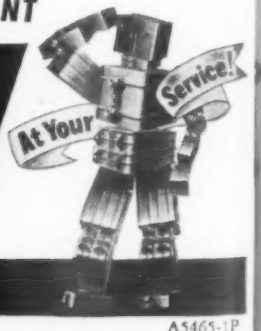
Style ¾ N Special (72" x 72" x 15" C x 15" D) is a Sterling Heavy Duty Flask with special reinforcing strips on both cope and drag. Its easy, light handling for a flask this size, makes it particularly practical for use in high-production grey iron foundries.

LARGE BUT LIGHT!

Write for new Sterling Catalog No. 59. It gives you complete information on all types of Sterling Flasks and other foundry equipment.

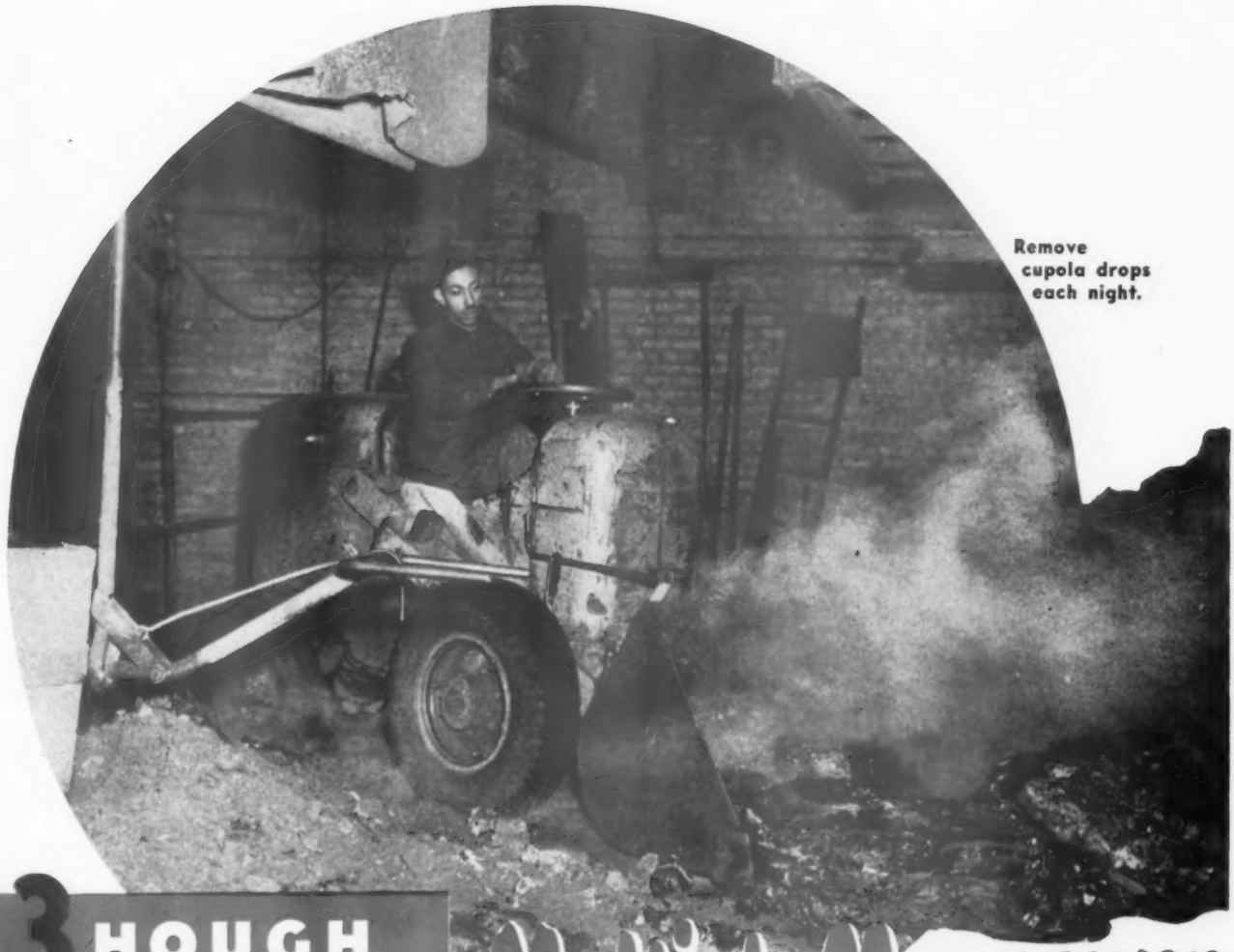
MORE THAN 4000 FOUNDRIES USE STERLING FOUNDRY EQUIPMENT

Sterling FOUNDRY FLASKS



STERLING WHEELBARROW COMPANY • Milwaukee 14, Wis., U.S.A.

A5465-1P



Remove cupola drops each night.

3 HOUGH PAYLOADERS

SAY "HUFF"

PATENT 2,412,323

Multiply Manpower

at Greenlee Bros. Tool Company . . .

Windrow sand for the cutter.

Negotiate 55-inch wide entrance and 30 degree ramp in sand bins.

The installation of three Hough Model HA Payloaders at the foundry of Greenlee Bros. Tool Co., Rockford, Ill., has greatly increased production, saves 64 man hours of labor per day, saves time on many operations. The machines deliver sand from storage bins to molding stations, unload box cars of sand and haul it 150 feet to storage bins, move 2½ tons of limestone and 10 tons of coke each day from storage to cupola on a 400 foot round trip. They also windrow all used sand for the sand cutter, return sand to reclaiming room after cutting, remove cupola drops each night, charge hopper of facing mixer machine, do general clean-up, clear gangways and shovel snow.

This Greenlee record is typical of Payloader accomplishments in hundreds of other foundries . . . of how these rugged, compact, mobile machines cut costs, save time, save manpower and increase production. It will pay you to get Payloader facts. Write today for literature on the 10½ cu. ft. Model HA and larger Payloaders, also the 2-yard Payloader Buggy.

SEND TODAY for bulletins on the 10½ cu. ft. Model HA Payloader, the ¾ yd. Model HF, the 1¼ yd. Model HL, the 2yd. Payloader Buggy.

THE FRANK G. HOUGH CO.

703 SUNNYSIDE AVENUE — *LIBERTYVILLE, ILLINOIS*

TRACTOR SHOVELS SINCE 1920

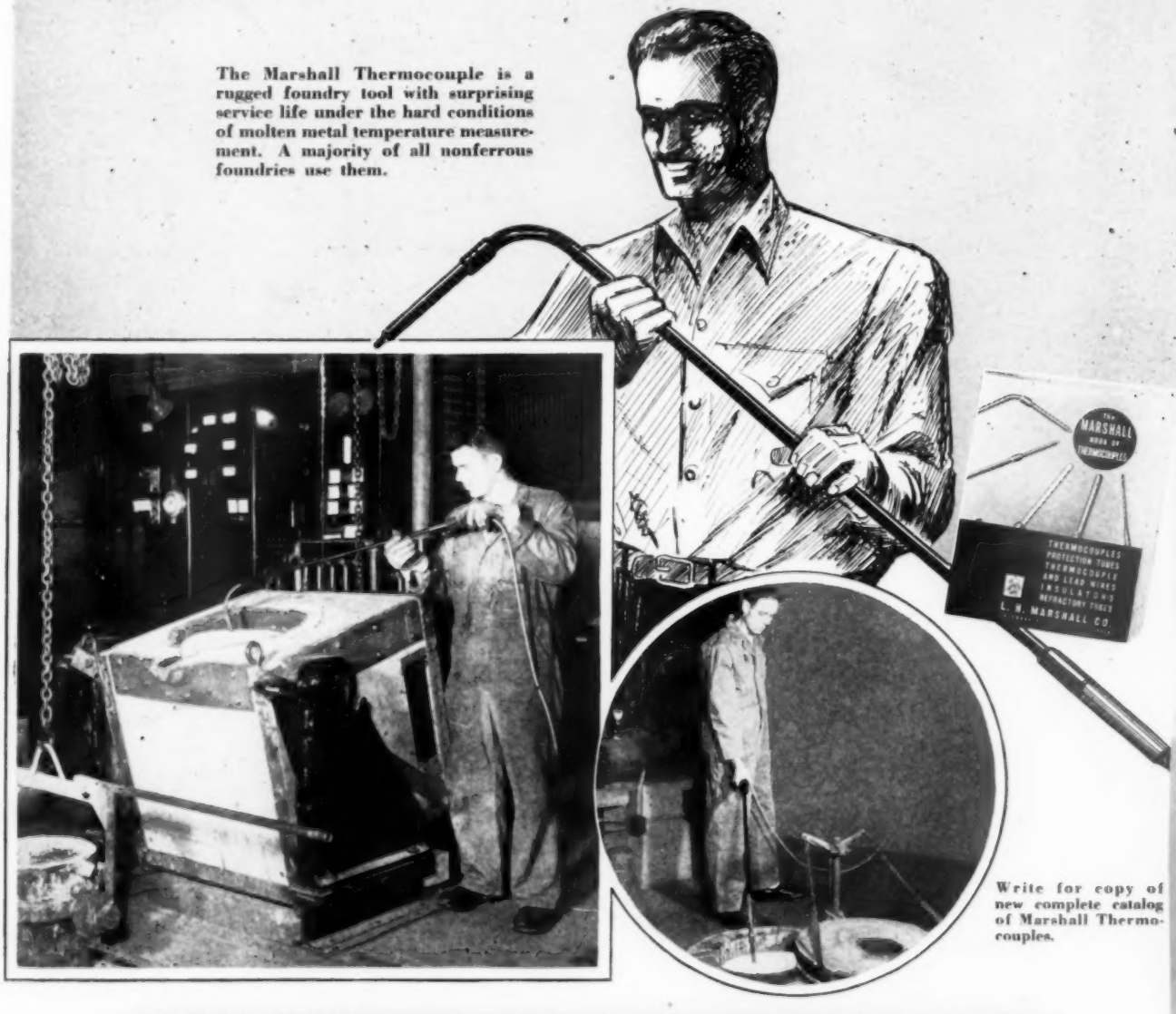
Closer Temperature Control For Better Castings!

With nonferrous foundry costs now running so high, it's no time to be making faulty castings! Right now is the right time to eliminate the causes of the wasteful misruns, cold-shuts, etc., that result in defective castings.

As you know, most of these errors can be corrected by closer control of pouring temperatures. With the Marshall Enclosed-Tip Thermocouple, the foundryman can check his metal temperatures quickly and dependably, thus eliminating overheating or underheating. The size of the scrap pile is reduced, and production costs lowered.

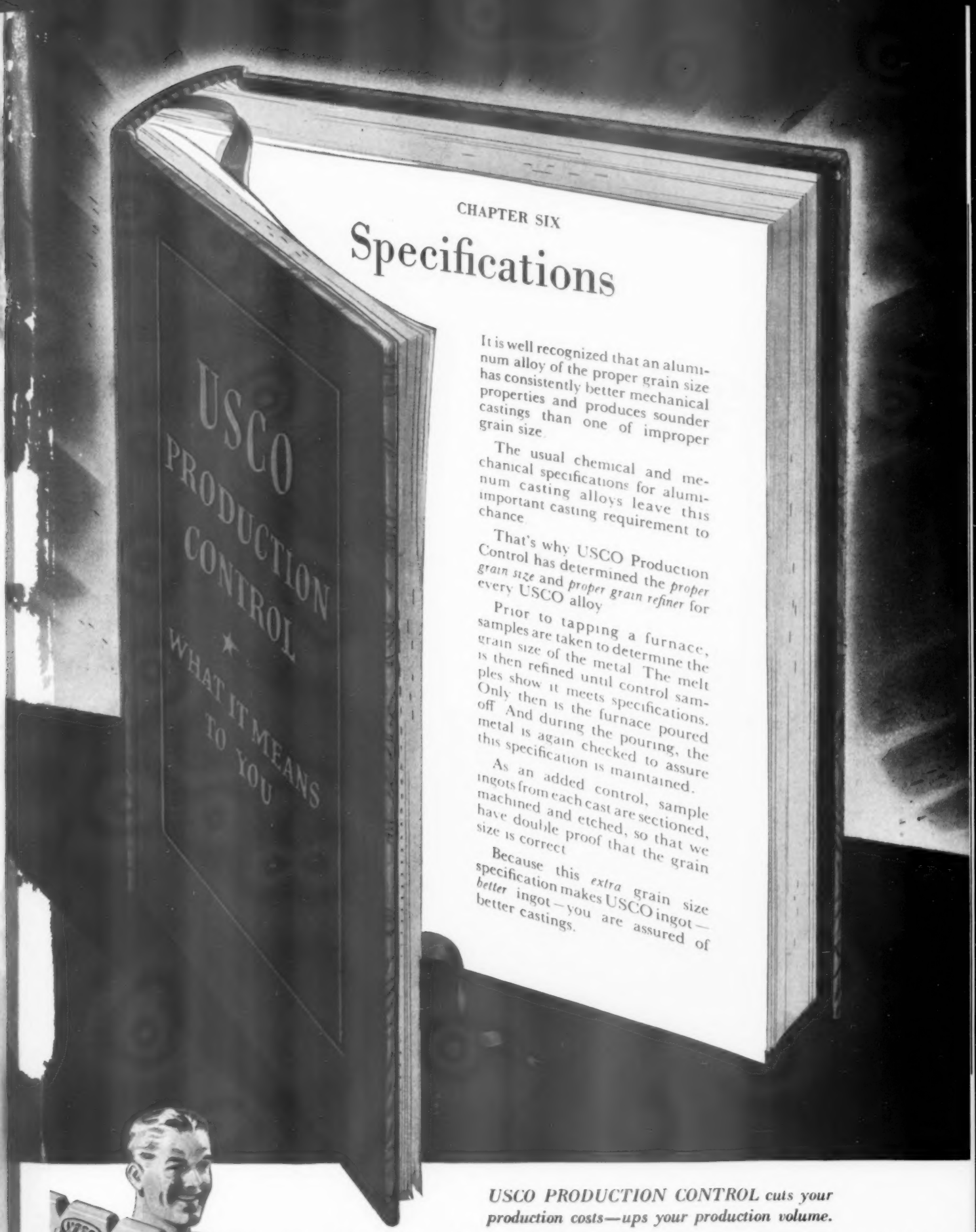
Marshall Enclosed-Tip Thermocouples are easy to use, and they withstand repeated immersions. They come in types for furnace and ladle use. Send for the Marshall Thermocouple complete catalog. L. H. Marshall Co., 270 W. Lane Ave., Columbus 2, Ohio.

The Marshall Thermocouple is a rugged foundry tool with surprising service life under the hard conditions of molten metal temperature measurement. A majority of all nonferrous foundries use them.



Write for copy of new complete catalog of Marshall Thermocouples.

MARSHALL
THERMOCOUPLES



CHAPTER SIX

Specifications

It is well recognized that an aluminum alloy of the proper grain size has consistently better mechanical properties and produces sounder castings than one of improper grain size.

The usual chemical and mechanical specifications for aluminum casting alloys leave this important casting requirement to chance.

That's why USCO Production Control has determined the *proper grain size* and *proper grain refiner* for every USCO alloy.

Prior to tapping a furnace, samples are taken to determine the grain size of the metal. The melt is then refined until control samples show it meets specifications. Only then is the furnace poured off. And during the pouring, the metal is again checked to assure this specification is maintained.

As an added control, sample ingots from each cast are sectioned, machined and etched, so that we have double proof that the grain size is correct.

Because this *extra* grain size specification makes USCO ingot—*better* ingot—you are assured of better castings.

USCO PRODUCTION CONTROL cuts your production costs—ups your production volume.

USCO ALUMINUM

Pioneer Producers of Quality Aluminum Ingot

U. S. REDUCTION CO. *East Chicago, Ind.*

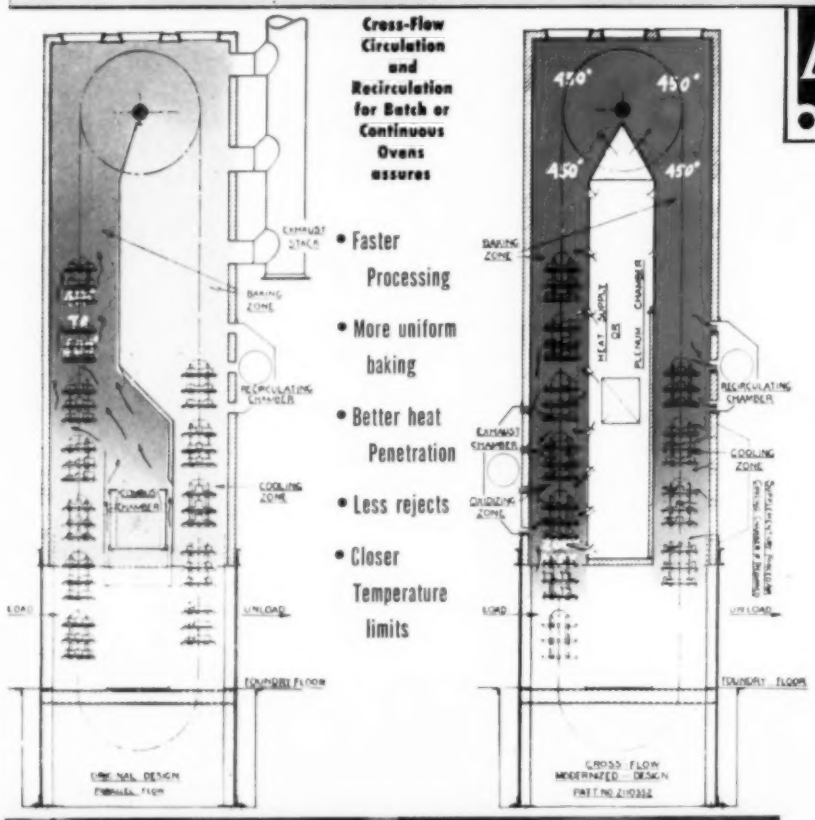
ENGINEERING ABILITY

DSM

BACKED BY 30 YEARS OF EXPERIENCE

DETROIT SHEET METAL WORKS

DETROIT, MICH. U.S.A.



Vertical core ovens

continuous horizontal baking ovens–batch type cabinet ovens

drawer ovens

industrial washing machines

---

complete finishing systems

Fabricated Parts

Pilot Equipment

Sample Size equipment for development of heavy Equipment

Write for our portfolio of varied illustrations

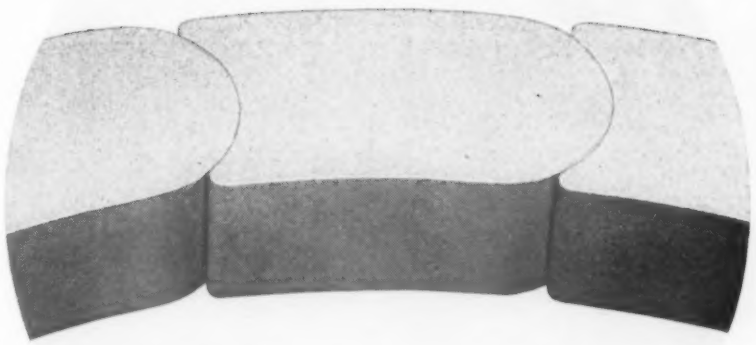
DSM SPECIAL MOTOR WASHING MACHINE

A	Width (Working Clearance)	44"			
B	Height (Working Clearance)	24"			
C	Width Over All	65"			
D	Length Over All	26' 8"			
E	Height Over All	8' 0"			
G	Wash Pump Capacity, G.P.M.	450			
	Motor Speed R.P.M.	1750			
	Motor H.P.	15			
	Wash Tank Capacity, Gals.	750			

DETROIT SHEET METAL WORKS

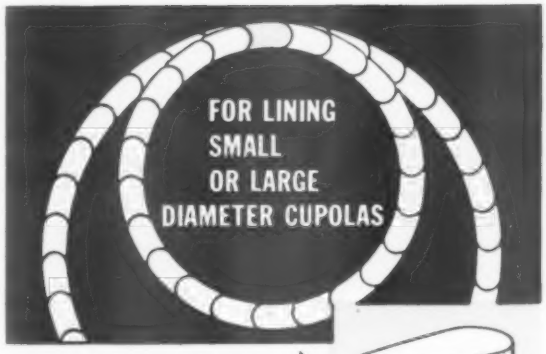
DETROIT -6- MICHIGAN

announcing

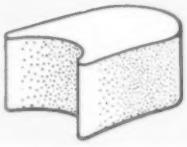


H-W Universal Cupola Blocks

PATENT APPLIED FOR



For 6-inch linings
Shape No. 602



For 9-inch linings
Shape No. 605

For 4½-inch linings
Shape No. 603

Cupolas of any diameter—from less than two feet to eight feet or more—can be fitted with one shape of H-W Universal Cupola Blocks. This is made possible by the fitted-curve of the blocks, which maintains complete contact over the entire end surfaces of adjacent blocks, regardless of the diameter of the circle. Thus, only one size block need be carried in stock for a given thickness of lining, for all sizes of cupolas. They can be fitted perfectly into stacks that are somewhat out of round. They are laid up quickly, are very easy to handle, and make a strong, tight joint.

The utmost care is used in the manufacture of Harbison-Walker Universal Cupola Blocks. Clays are carefully selected and accurately proportioned to make the refractory best suited for each particular service condition. Three sizes of Harbison-Walker Universal Cupola Blocks are offered to meet your requirements for linings of various thicknesses. Send for new bulletin on Harbison-Walker Universal Cupola Blocks.

TRADE MARK
REG U S PAT OFF

arbison · alker
REFRACTORIES COMPANY *and Subsidiaries*
GENERAL OFFICES · PITTSBURGH 22, PA.

WORLD'S LARGEST PRODUCER OF REFRACTORIES

the Simpson Mixer is

—says Banner Iron Works, referring to the sand conditioning system they designed, built and installed in 1943, under the very able direction of Mr. W. E. Illig

Banner Iron Works
FABRICATED STEEL PRODUCTS
GRAY IRON CASTINGS
MEEHANITE METAL CASTINGS
4960 SHAW BOULEVARD
Saint Louis 10 August 21st, 1946

National Engineering Company
549 West Washington Boulevard
Chicago, Illinois

Attention: Mr. Webb L. Hammerer

Gentlemen:

During the defense program, we operated our foundry at approximately 400 tons a month, with a #1 Simpson Muller which was purchased about 1940.

As the foundry demands for better mulled molding and core sands developed, and due to increased war production requirements, this small muller was forced to operate from 20 to 24 hours per day, and was still far below meeting the demands for properly conditioned sand. During 1940 a sand conditioning system was designed. This system was such that all of its various details had to function or the foundry could not operate. After some investigation, it was decided to purchase for this system, a #2 Heavy Duty Simpson Muller. The system was installed early in 1943. The equipment was originally designed to handle, the main bay, which requires about 100 tons; the side floor, 25 tons; and, two rollover machines, demanding about 100 tons, totaling about 225 tons daily. In addition to the main floor, heap and facing sands, core sand requirements are also prepared in this system.

After operating approximately a year on this basis, it was decided to condition the squeeze floor sand in the same system. The sand required for these floors is approximately 50 tons daily. As we use all synthetic mixes, all heap and facing sands pass through this system daily.

It goes without saying that the Simpson Muller is the heart of this system. In the event a defect occurred in the Muller, all molding operations would be forced to stop for want of sand as no sand is stored on the foundry floor. We are happy to say that we have had 3½ years of continuous operation, without shutdown, and that during this period, only a few minor repairs on the muller were necessary and, thanks to the service that the National Engineering Company gave us, we were able to make these minor repairs without interruptions in our molding operations.

Yours very truly,

BANNER IRON WORKS

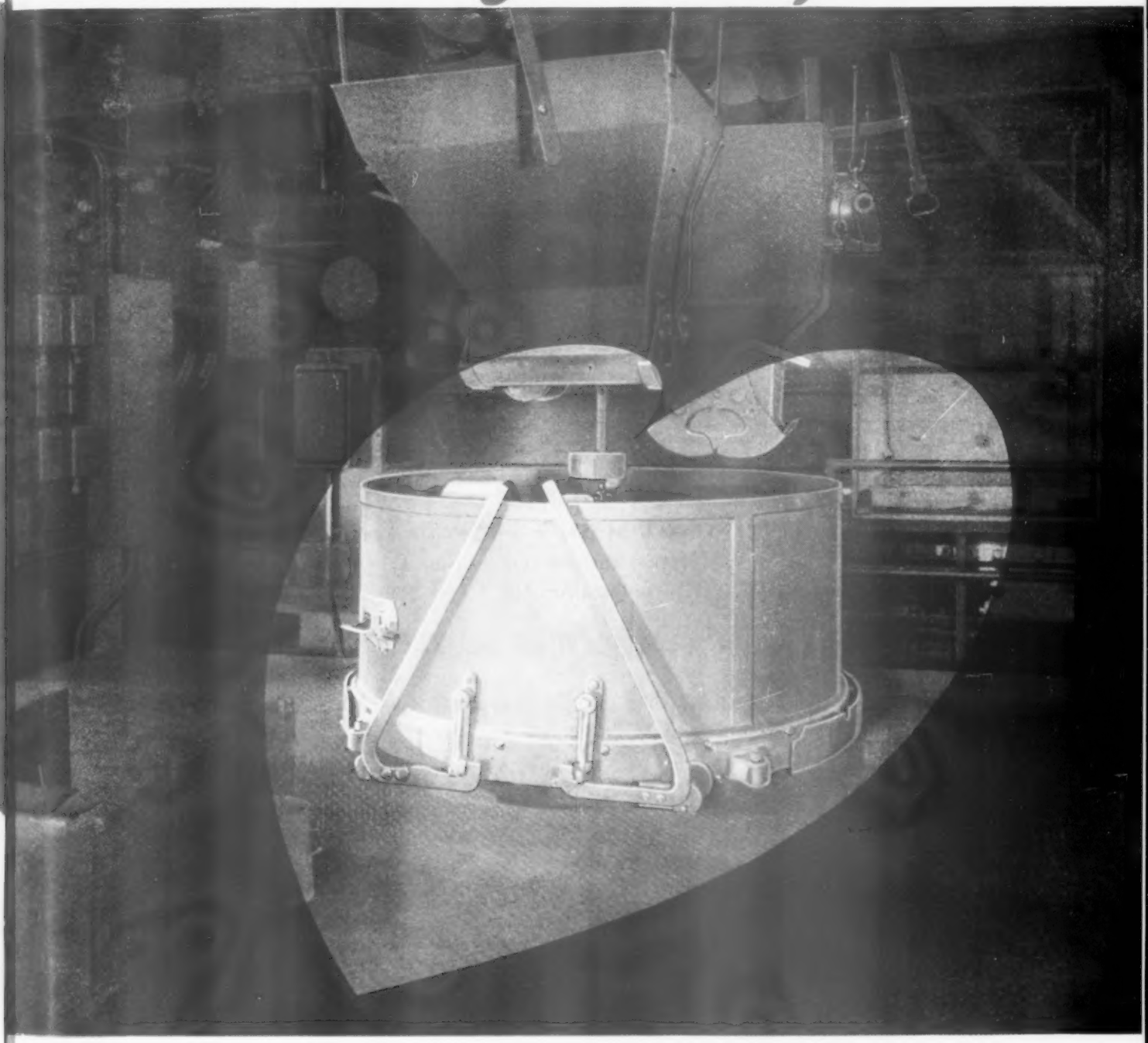
W. E. Illig
Vice President

- **The accompanying letter is indicative of the way in which Simpson Mixers are meeting foundry demands for a greater production of better quality molding and core sands . . . day after day, year after year.**

This evidence of superior performance is not an isolated case. On-the-job reports in foundries both large and small prove that Simpson Mixer installations are constantly producing foundry sand better, faster and at less cost.

Ask a National Engineer to discuss the details with you.

the heart of this system



• Illustrated here is the No. 2 Simpson Mixer referred to as the "heart" of the sand conditioning system at the Banner Iron Works foundry, which has now had 3½ years of continuous operation without shut-down.

MANUFACTURER'S ASSOCIATION INC. FOUNDRY EQUIPMENT

NATIONAL ENGINEERING COMPANY

608 MACHINERY HALL BLDG. • CHICAGO 6, ILLINOIS

Manufacturers and Selling Agents for Continental European Countries—The George Fischer Steel & Iron Works, Schaffhausen, Switzerland. For the British Possessions, Excluding Canada and Australia—August's Limited, Halifax, England. For Canada—Dominion Engineering Co., Ltd., Montreal, Canada. For Australia and New Zealand—Gibson, Battle & Co., Pty., Ltd. Sydney, Australia

ROSSBOROUGH

Nonferrous Fluxes

SPECIALISTS IN NONFERROUS FLUXES FOR 16 YEARS

BRASS AND BRONZE FLUX— A neutral flux with low melting point which protects your metal during the melting process and keeps furnace and crucibles clean without attacking the linings.

ALUMINUM FLUX— An all purpose aluminum flux designed to deoxidize, de-gas and increase recovery from skimmings at a lower temperature.

ALUMINUM BOILING FLUX— A special aluminum flux for preventing shrinks and misruns in permanent mold and thin section sand castings.

ALUMINUM SMELTING FLUX— A powerful flux for use on all scrap materials. Reacts at a low temperature increasing metal recovery. Recommended for smelting use or for remelting of gates, borings and scrap.

COMPLETELY STOCKED JOBBERS

Boston, Mass.	Malcolm G. Stevens Co., 78 Summer St., Arlington, Mass.
Brooklyn, N. Y.	New York Sand & Facing Co., 106-114 Grand Ave.
Chattanooga, Tenn.	Manufacturers Equip. & Supply Co., 1200 Fort St.
Chicago, Ill.	Foundry Supplies Co., 461 West 33rd Street
Cleveland, Ohio	Hoffman Foundry Supply, 1193 Main Ave.
Dayton, Ohio	Fenton Foundry Supply Co., 134 Gilbert Street
Detroit, Michigan	Wolverine Foundry Supply Co., 3211 Bellevue Ave.
Indianapolis, Ind.	John M. Glass Co., 18 S. New Jersey St.
Philadelphia, Pa.	George F. Pettinos Co., 1206 Locust St.
St. Louis, Mo.	M. W. Warren Coke Co., 1017 Olive St.
Los Angeles, Calif.	Independent Foundry Supply, 2325 E. 38th Street

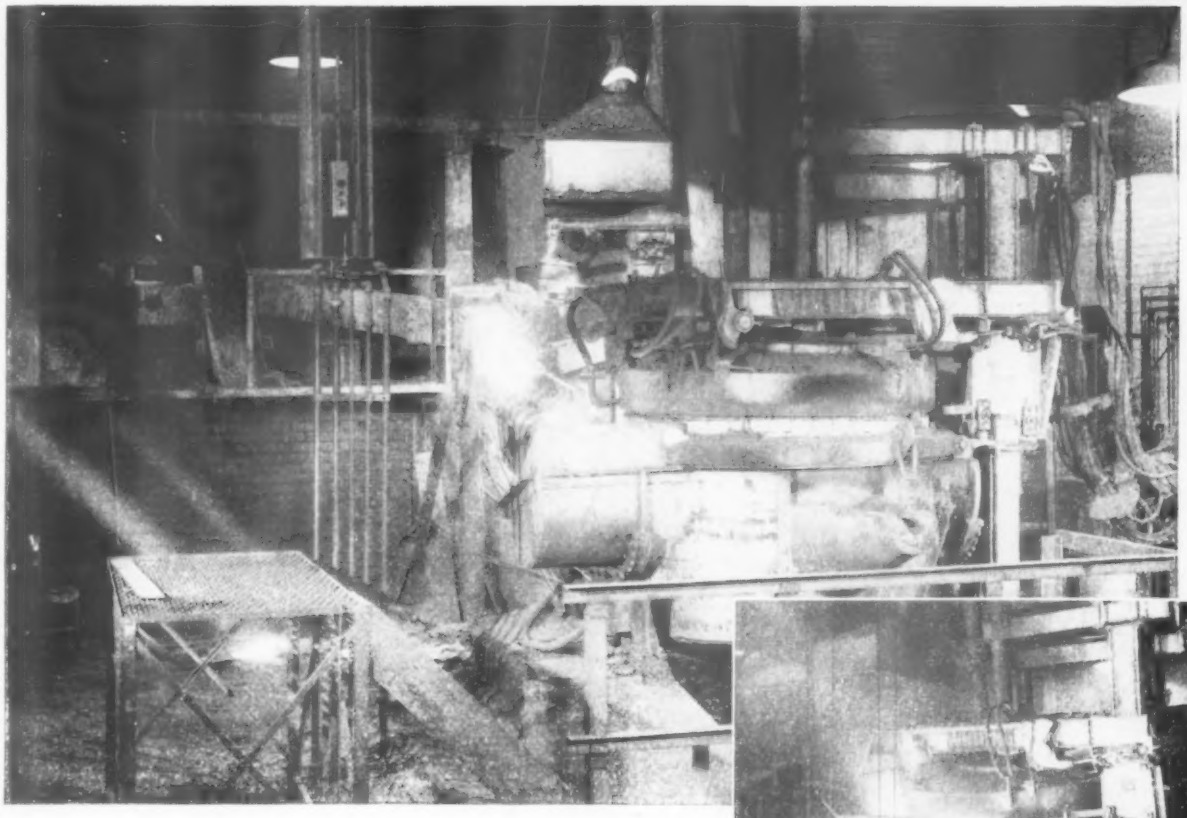
ROSSBOROUGH SUPPLY COMPANY

1457 WEST NINTH ST. CLEVELAND, OHIO

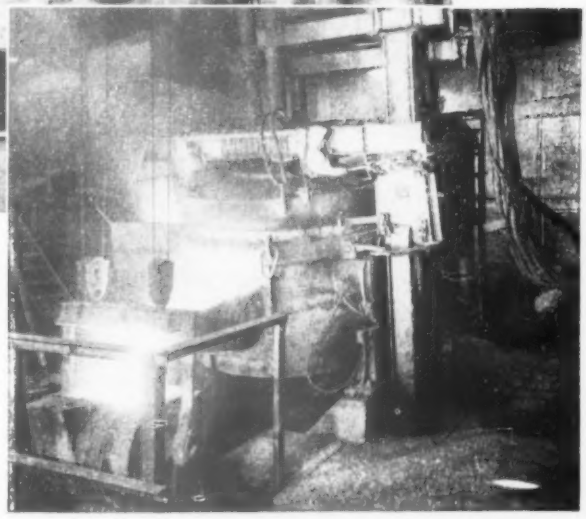
Cupola to Electric

MELTING WITH NEW CONVENIENCE

BETTER CASTINGS



Whiting Electric Furnace used for holding cupola metal. Note hot metal flowing continuously from the Whiting Cupola to the Whiting Hydro-Arc Furnace.



The same furnace with power on, pouring metallurgically adjusted, superheated metal into a ladle.

Whiting Hydro-Arc Furnaces have established new standards of convenience and economy in electric melting and heating. Floor-operated electrode clamps save workmen having to climb over the furnace to serve out electrodes that stay tight. Counter-balanced hydraulic electrode positioning equipment provides the kind of regulation required in this operation.

In some foundries, as in this one, Hydro-Arc Furnaces are used as holding furnaces to increase the temperature of cupola metal and provide facilities for metallurgical adjustments. Whiting engineers will gladly discuss with you this and many other foundry uses for Hydro-Arc Furnaces.

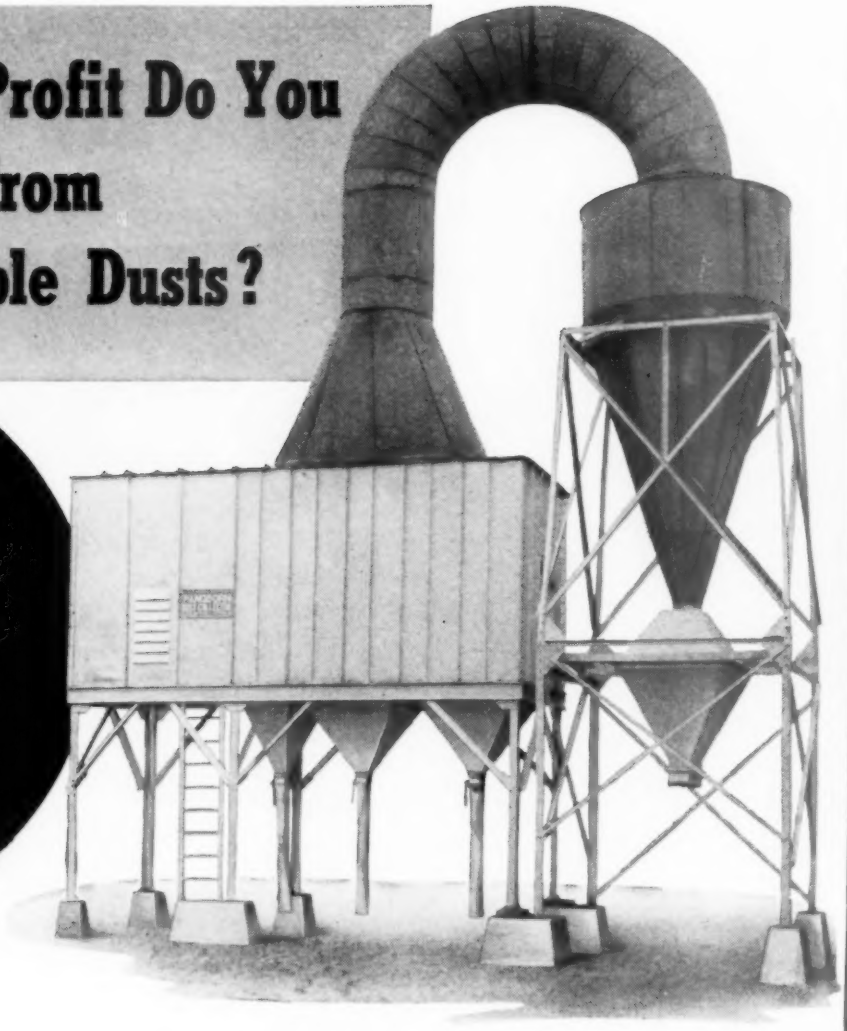
WHITING
CORPORATION

15607 Lathrop Ave., Harvey, Illinois

Offices in Chicago, Cincinnati, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, and St. Louis. Agents in other principal cities. Canadian Subsidiary: Whiting Corporation (Canada) Ltd., Toronto, Ontario. Export Department: 30 Church St., New York 7, N. Y.

How Much Profit Do You Lose From Salvageable Dusts?

Pangborn DUST CONTROL PUTS THAT PROFIT IN YOUR POCKET



HERE'S proof . . . actual cases of dust salvage profits quoted by enthusiastic Pangborn users . . .

- *Prominent cork manufacturer salvages $5000 yearly on cork dust sales.*
- *Large feed mill and asbestos manufacturer both save $50 daily on salvage.*
- *Over $60 daily is dust salvage saving of well-known charcoal mill.*

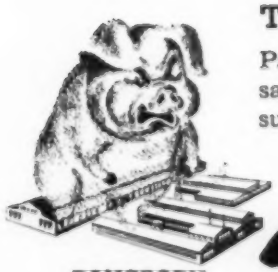
. . . But Pangborn Does More Than Salvage

Pangborn Dust Control Equipment has saved many satisfied customers even greater sums by stepping up worker efficiency, quality of product and production by removing industrial dust from working areas. For instance, a metal specialties company, whose dust salvage value was negligible, reports Pangborn Dust Control reduced plant expenses and saved approximately $8000 per year. A large foundry credits Pangborn Dust Control with indirect savings of 25%.

Pays for Itself

All these cases, and hundreds like them in the Pangborn customer file, show that with these substantial savings applied against Pangborn low operating cost and minor maintenance, Pangborn Equipment pays for itself quickly. If you want a dust-controlled plant, opportunities for salvage profits, increased and better production, write today for information on Pangborn Dust Control to:

PANGBORN CORPORATION, 300 Pangborn Blvd., Hagerstown, Md.



PANGBORN STOPS THE DUST HOG from stealing your profits

Pangborn DUST CONTROL

Turns Dust Losses Into Profits

HERE'S HOW...

LINDBERG-Fisher 2-CHAMBER MELTING FURNACE BEATS THE HEAT OF SUMMER

—reduces temperature 17°F. at operator's station

A well known Chicago manufacturer of aluminum and zinc die cast products beat the heat by installing this 40 KW Lindberg-Fisher 2-Chamber Induction Furnace for melting aluminum. Temperatures measured at the operator's station (3 feet from furnace) show:

Before*	After*
FUEL FIRED FURNACE	2-CHAMBER INDUCTION FURNACE
115°F.	98°F.

*Outdoor temperature 90°F.

The Chief Engineer says: "Working conditions for our operators have been greatly improved because of lower temperature in the immediate area of the furnace. Furnace shell is so cool that you can touch it with bare hands. We also find that molten metal is noticeably cleaner and, dross loss is considerably reduced."

Lindberg-Fisher Advantages:

COOLER OPERATION—Induction heating heats only the metal, not the entire furnace. No flame,—no products of combustion. Only comparatively small area of molten aluminum is exposed to operator.

CONTINUOUS LADLING—2-Chamber design allows cold metal to be added to charging chamber—does not affect temperature of ladling chamber within operating limits of the furnace.

ACCURATE TEMPERATURE CONTROL—Electronically controlled temperature equipment reduces scrap loss—allows lower maximum temperatures—eliminates over shooting and under shooting.

CLEANER MOLTEN METAL—Residue and impurities remain in charging chamber—only clean, residue-free metal passes to ladling chamber.

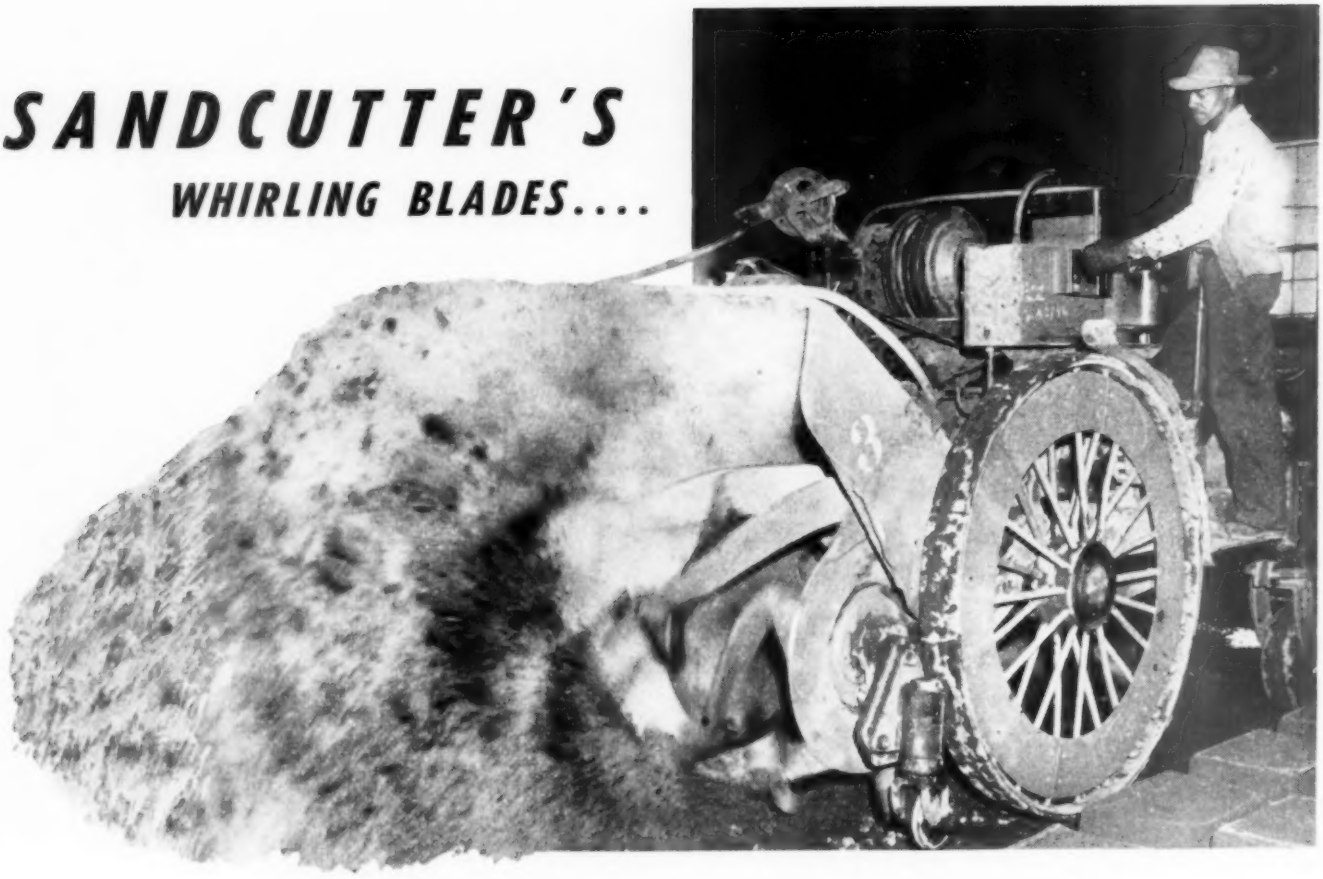
Ask for Bulletin 510 "Lindberg-Fisher 2-Chamber Induction Furnaces for Melting and Holding"

Fisher Furnaces

A DIVISION OF LINDBERG ENGINEERING CO.

2453 West Hubbard Street, Chicago 12, Illinois

SANDCUTTER'S
WHIRLING BLADES....



help beat the cost spiral

With the cost of materials and manpower steadily mounting, there is but one opportunity left for the foundryman to keep his production costs down. The answer is found in machinery and production methods that will make it possible to produce more castings . . . better castings . . . or the same number of castings in less time. The American Sandcutter does all three. It takes only one man to operate a Sandcutter. It cuts the sand right on the molding floor. There is no hand shoveling or carrying of the sand. The Sandcutter cuts through every particle of sand again and again, breaking up all lumps and evenly distributing the bond and moisture. No lump or particle can escape the whirling blades. The sand is thoroughly mixed, aerated and cooled as it is thrown into the air and tossed from side to side. It is loose, soft, fluffy and cool. It riddles fast, rams easily and vents perfectly. Because the Sandcutter conditions the sand so thoroughly, molders can put up more molds per day. The uniformity of the sand makes uniform castings. And due to the speed and simplicity of operation of the Sandcutter, the cost of conditioning the sand per floor is extremely low. You can keep your costs down . . . with a Sandcutter.

Write for literature on any of these four Sandcutter models: Light floors (Model AM); Medium floors (Models AA and M); Heavy floors (Model K).

American
WHEELABRATOR & EQUIPMENT CORP.
(FORMERLY AMERICAN FOUNDRY EQUIPMENT CO.)
505 S. Byrkit St. Mishawaka 2, Indiana

Sandcutters

CASTFLUX

The National Dual Purpose Flux is used effectively

IN THE LADLE

Cleanses and purifies the metal, bringing to the surface occluded oxides, gases, slag, dirt, and other foreign matter, offsetting the negative factors of inferior scrap and coke.

ON BOTH BLIND AND OPEN RISERS CASTFLUX raises the temperature of the metal to a much higher degree and substantially increases and maintains the fluidity of the metal during the entire cooling-down period.

*This is the CASTFLUX
UNCONDITIONAL GUARANTEE
Unless our representations are proven within 30 days after receipt of material, it can be returned at no expense to you.

One of the questions we're asked by foundrymen is "How much will it cost us to use Castflux?" We quote the above figures. But does Castflux really add to the cost of production? Theoretically no! Because when the expenditure for a product eliminates losses far in excess of its cost there are savings that otherwise would not be in the pocket.

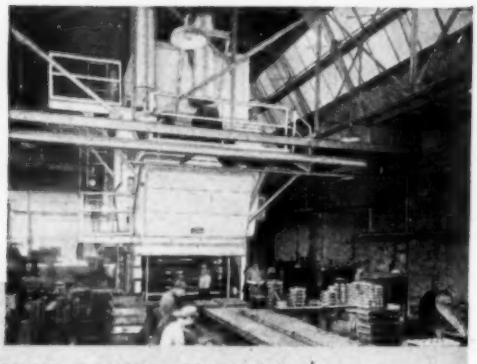
Why not put our claims to the test? Castflux is sold on an unconditional guarantee*. You risk no money. Write us for prices, complete data.

NATIONAL

PIGMENT COMPANY

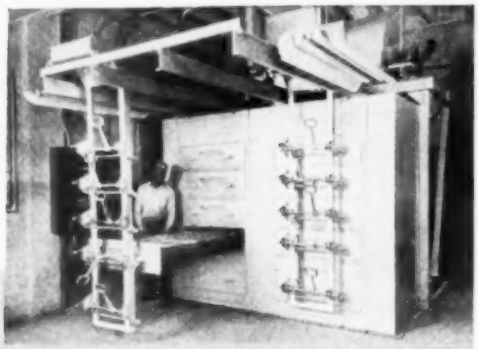
2115-2117 EAST YORK STREET
PHILADELPHIA 23, PA.

THERE ARE MANY OTHER TYPES OF COLEMAN OVENS SUITED TO THE CORE BAKING AND MOLD DRYING REQUIREMENTS EXISTING IN YOUR OWN FOUNDRY



COLEMAN TOWER OVENS

For high speed production at lowest cost. Patented Open Center permits loading from inside and out, providing maximum labor saving.

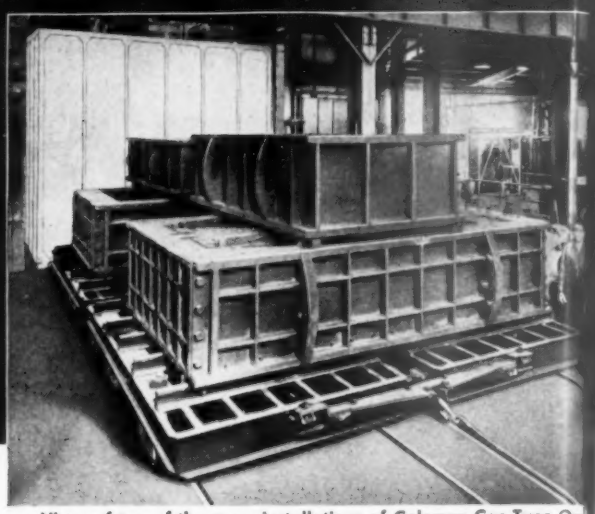


COLEMAN ROLLING DRAWER OVENS

For small and medium cores. High-speed production with limited floor space.

COLEMAN TRANSRACK OVENS

For use with portable racks to reduce handling labor. Very efficient where ample floor space is available.



Views of two of the many installations of Coleman Car-Type Ov in plants of The Cooper-Bessemer Corp.

A FEW REPRESENTATIVE OWNERS OF COLEMAN CAR-TYPE OVENS

Ingersoll Rand Co.
Worthington Pump & Machy. Co.
Chicago Pneumatic Tool Co.
Allis Chalmers Manufacturing Co.
Clark Bros. Co., Inc.
Fairbanks, Morse & Co.
National Supply Co.
Nordberg Manufacturing Co.
DeLaval Steam Turbine Co.
American Locomotive Co.
Baldwin Locomotive Works
General Steel Castings Corp.
Falk Corporation
Farrel-Birmingham Co.
United Engineering & Foundry
Continental Fdry. & Mach. Co.
Bullard Co.
E. W. Bliss Co.
Cincinnati Milling Machine Co.
General Electric Co.
Westinghouse Electric Corp.
Bethlehem Steel Co.
Carnegie-Illinois Steel Corp.
American Brake Shoe Co. & D
* Babcock & Wilcox Co.
Armco Steel Corp.

COLEMAN HEATING SYSTEMS USE THE MOST ECONOMICAL FUEL AVAILABLE TO YOU: GAS, OIL, STOKER-COAL, ELECTRICITY, ETC.

The FOUNDRY EQUIPMENT CO

CLEVELAND 13, OHIO, U. S. A.

WORLD'S OLDEST AND LARGEST FOUNDRY OVEN SPECIALIST

COLEMAN
CAR-TYPE OVENS
"ELIMINATE ALL DRYING VARIABLES"

writes J. D. JAMES—The Cooper-Bessemer Corp.

"Our Coleman Ovens have seen a lot of heavy service and are doing a remarkably fine job in every way. These ovens have completely eliminated all former baking and drying variables. In ridding ourselves of these uncertainties we have not lost a single Diesel Cylinder Head casting due to drying.

We no longer have such a condition as the scrapping of molds on account of over-drying, nor find it necessary to re-heat any molds because of imperfect drying. This part of our operation used to cause us plenty of headaches.

The savings from our shortened drying cycles, absolute uniformity in mold drying, and elimination of mold and casting scrappage have long since returned our investment in Coleman Ovens."

Throughout the foundry industry, wherever large cores and dry sand molds are handled, Coleman Car-Type Ovens are the acknowledged leaders in dependable performance and low-cost operation. Here's why:

COLEMAN CONTROLLED HEATING SYSTEMS produce perfectly baked cores and correctly dried molds. The elimination of all baking and drying variables means reliable, uniform results in place of guess-work and uncertainty—reduces mold and casting scrappage.

COLEMAN HEAVY DUTY CONSTRUCTION is responsible for dependable performance, economical operation and low maintenance cost under rugged service requirements.

COLEMAN KNOW-HOW has been gained through specialization in the field of foundry ovens. Coleman Oven Engineers have been designing and building foundry ovens for over 40 years.

Most of the large core and mold ovens used by well-known foundries in every class of heavy casting production are Coleman Car-Type Ovens. The outstanding quality of Coleman Ovens is shown by their widespread use by such concerns as those listed to the left.

WRITE TODAY FOR BULLETIN 48

COLEMAN CAR-TYPE OVENS ARE AVAILABLE IN A WIDE RANGE OF SIZES AND CAPACITIES FOR VARIOUS PRODUCTION NEEDS, ASSURING DEPENDABLE PERFORMANCE AT LOWEST POSSIBLE COST

COMPANY

BUILDERS OF COLEMAN AND SWARTWOUT OVENS

MEMBER MANUFACTURERS ASSOCIATION, INC. FOUNDRY EQUIPMENT

COLEMAN
CORE AND MOLD OVENS

OVER 9000 SUCCESSFUL INSTALLATIONS

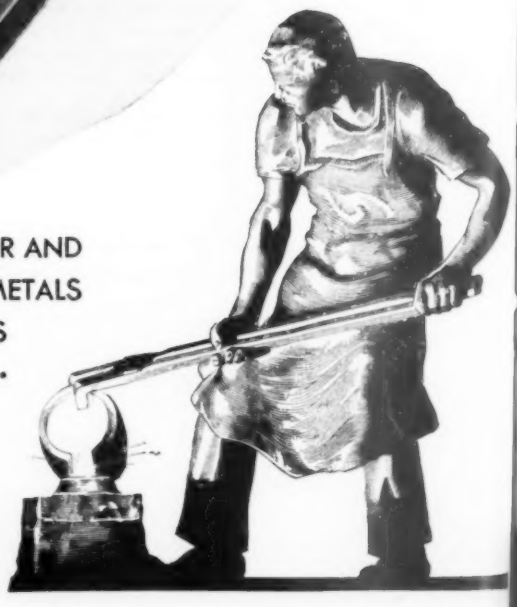
Permanent Molds of High Precision and Efficiency

Having been leaders in this field for many years, we have the know how and the most modern machine tools for producing accurate and efficient permanent molds for every type and purpose. May we hear from you?

Send us your specifications and blueprints. All inquires receive prompt and careful attention.

We cordially invite you to write, wire or phone us for complete information covering your own particular problems, or to request a personal interview at your plant.

PERMANENT MOLDS • WOOD AND METAL PATTERNS • KELLER AND DUPLICATOR WORK • MACHINE WORK • MALLORY METALS BERYLLIUM COPPER • MONEL METAL • EVERDUR CASTINGS COPPER CASTINGS OF HIGHEST ELECTRICAL CONDUCTIVITY • BRASS, BRONZE AND ALUMINUM CASTINGS

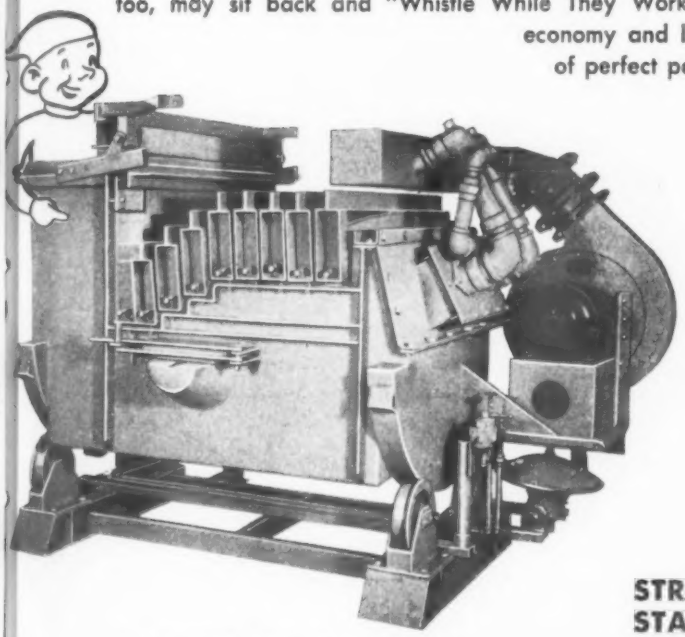


CITY PATTERN
FOUNDRY AND MACHINE CO.

1161 HARPER AT RIVARD • DETROIT 11, MICHIGAN

YOU can whistle . . . while THEY work!

Here are a few furnaces that are now being used by many of the leading organizations in the foundry, die casting and permanent mold industries throughout this country of ours. They have done their respective jobs well! The fact is, when you install a Stroman Furnace for any non-ferrous metal melting job, you too, may sit back and "Whistle While They Work," for their efficiency, economy and longevity are your assurance of perfect pours, every time, at lowest costs.



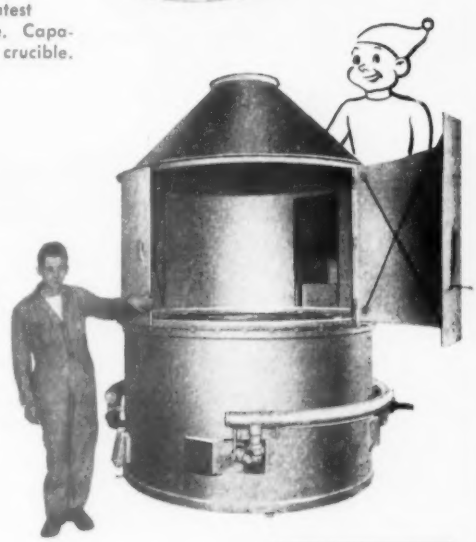
STROMAN CRUCIBLE STATIONARY MELTING FURNACES

For Brass, Bronze, Aluminum and other non-ferrous metals. Sturdy, efficient and featuring the Stroman Push-Back Cover these stationary furnaces are designed for peak production and greatest fuel economy. Oil or Gas Fire. Capacities from No. 20 to No. 400 crucible.

ECONOMELT FURNACES

The Best Direct Fired Reverberatory Melting Furnace on the market! Its speed in melting Brass, Bronze, Grey Iron or Aluminum is unmatched! Continuous charging . . . with cold metal never reaching the molten bath, makes it practically a continuous pour furnace . . . and it will show upwards of 40% in fuel cost savings. Oil or gas fire. Also can be furnished with combination oil, gas burner. Capacities (Brass) up to 2000 lbs. Write for Bulletin No. 635 for full information.

STROMAN IRON POT STATIONARY MELTING FURNACES

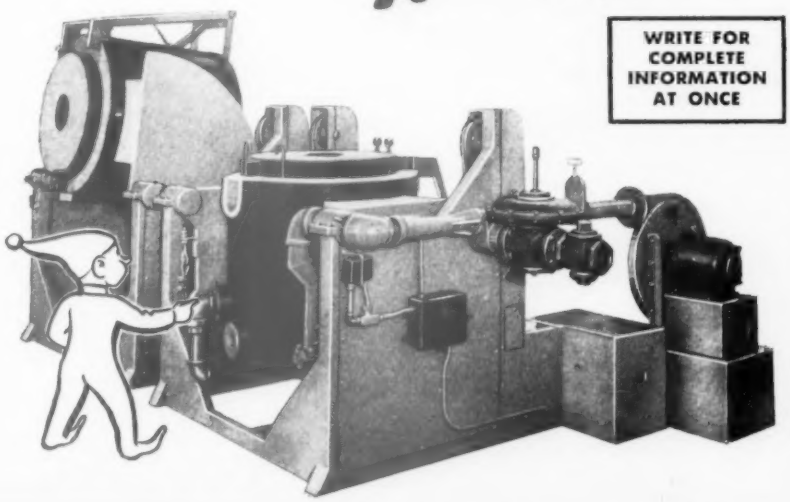


These furnaces are highly recommended as break down furnaces for zinc die casting plants. They also excel as aluminum holding furnaces. They can be supplied with or without hoods to exhaust fumes and heat. Their construction assures longest pot life and lowest fuel costs. Choice of manual or automatic controls and gas or oil fire. Capacities from 212 to 14,000 lbs. of zinc.

WRITE FOR COMPLETE INFORMATION AT ONCE

STROMAN MECHANICAL OR HYDRAULIC TILT CRUCIBLE MELTING FURNACES

For Brass, Bronze, Aluminum and other non-ferrous metals. Stationary Lip Pour assures a constant pouring arc, eliminating the necessity of moving the ladle at any time during a pour. They are excellent for use in permanent mold and die casting plants as well as any foundry. Their sturdy construction assures longest life, and their economical operation results in lowest production costs. Oil or gas fire. Built in sizes to handle capacities from No. 125 to No. 400 crucible.



STROMAN FURNACE & ENGINEERING CO.

DIVISION OF

THE PETERSEN OVEN CO. • 9900 FRANKLIN AVE. • FRANKLIN PARK, ILL.

A BUYING GUIDE FOR ABRASIVES

ABRASIVE PROBLEM:

Is the correct abrasive available?

ANSWER BY

CARBORUNDUM
TRADE MARK

The Carborundum Company produces the only complete line of abrasives under one trade mark. With industrial techniques utilizing a wider variety of different abrasive products, it is only logical to turn to The Carborundum Company as the one primary source of all abrasive needs.

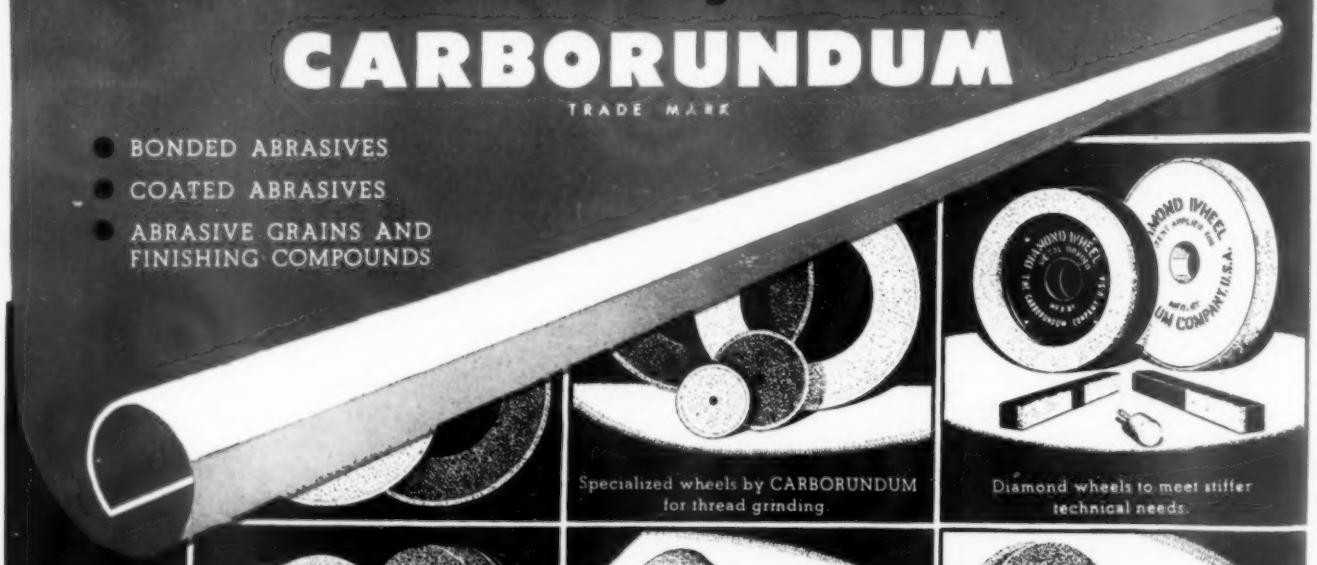
The specialized service of experienced representatives is available to recommend, impartially, the best abrasive products for specific requirements. Product quality is known and highly regarded. Satisfaction is assured. Responsibility is definitely fixed and undivided.

In part, this helps explain the increasing preference for abrasives by CARBORUNDUM. The Carborundum Company, Niagara Falls, N. Y.

A Good Rule for Good Grinding...CALL IN

CARBORUNDUM
TRADE MARK

- BONDED ABRASIVES
- COATED ABRASIVES
- ABRASIVE GRAINS AND FINISHING COMPOUNDS



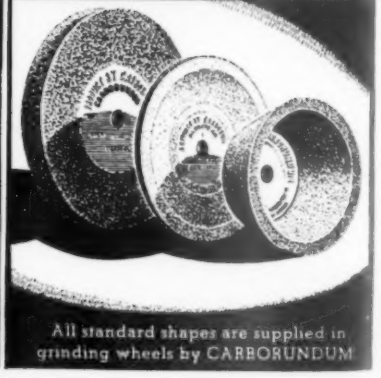
Specialized wheels by CARBORUNDUM for thread grinding.

Diamond wheels to meet stiffer technical needs.

"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company.

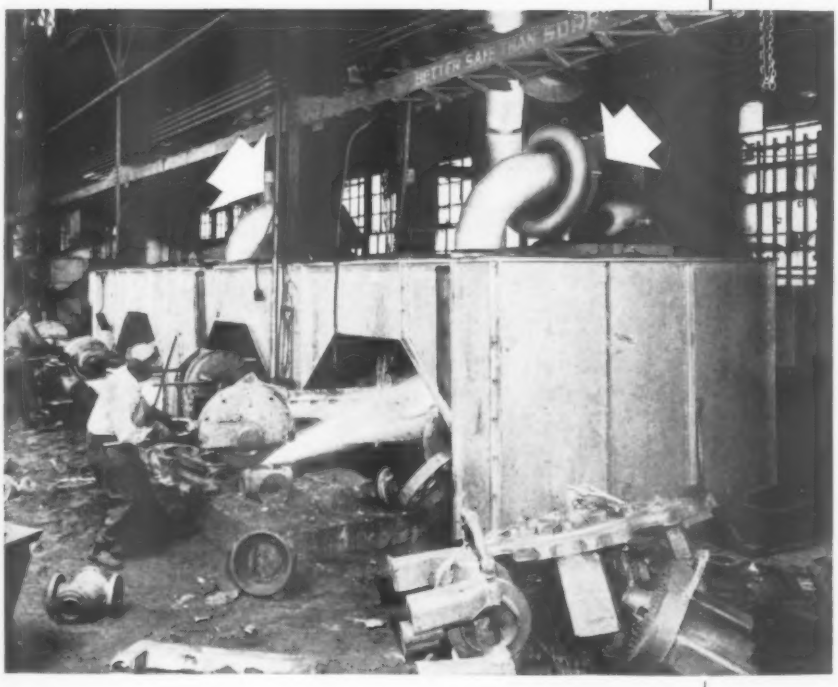
Cool-cutting GREEN GRIT wheels for cemented carbide.

A coated abrasive for every sanding and finishing condition.



All standard shapes are supplied in grinding wheels by CARBORUNDUM

ROTO-CLONES snap up dust from swing frame grinders



The Type D units serving these swing frame grinders are but two of seventeen Roto-Clones controlling additional swing frame grinders, stand grinders, cut-off saws, electric furnaces and sand handling equipment in this steel foundry.

**Roto-Clone is the trade-mark (Reg. U. S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydro-static precipitator types.*

WHEN it comes to dust the swing frame grinder outproduces any other grinding machine. But you would never guess it from this picture. Note the clearness of the atmosphere — the complete freedom from dust. It's visual evidence of Roto-Clone* efficiency. Two Type D units serve this operation and in addition fifteen Roto-Clones control dust in this plant from stand grinders, electric furnaces, cut-off saws and sand handling equipment.

Here's why there are more grinders exhausted by Type D Roto-Clones than any other type of dust collector—

1. **CONSTANT EFFICIENCY** in dust separation under all operation conditions.

2. **UNIFORM AIR VOLUME,** assuring proper suction at hoods and unvarying air velocities in pipe lines.

3. **SMALL SPACE REQUIREMENT**—functions of exhauster and separator combined in compact, self-contained unit.

4. **LOW COST OF SYSTEM**—Roto-Clone may be located at or near dust source, eliminating long pipes and the expense of outdoor installations.

5. **EASE OF INSTALLATION**—requires only electrical and piping connections—no complicated parts assembly. May be readily moved to new location if desired.

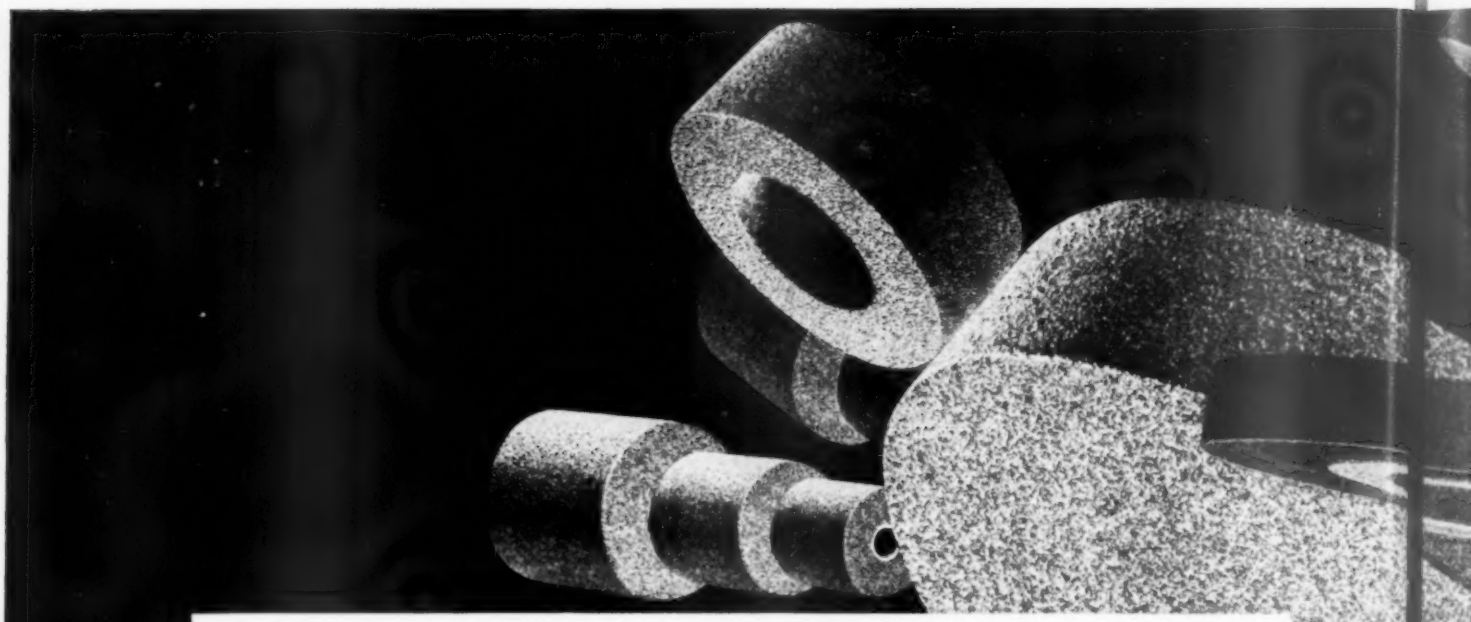
A Type D Roto-Clone Dust Control System may be installed as a central type with main duct and branch connections, or as an individual unit serving a single dust-producing operation. For complete information, call your local AAF representative or write direct to—

AMERICAN AIR FILTER COMPANY, INC.
266 Central Ave., Louisville 8, Ky.
In Canada: Darling Bros., Ltd., Montreal, P. Q.

MEMBER MANUFACTURERS ASSOCIATION INC. FOUNDRY EQUIPMENT

AAF

ROTO-CLONE®
DUST CONTROL EQUIPMENT



How to stop run-away grinding costs

In this period of rising costs, wouldn't you like to stop your run-away grinding costs dead in their tracks?

Here's the surest way to do it: put your emphasis on really *efficient operation*, not on low initial costs. For cheap grinding wheels, with low wheel-life and stock-removal and high dressing costs, never pay off in the long run.

It's by increasing the efficiency of your grinding that Peninsular can lower your costs. For Peninsular furnishes you with wheels individually engineered for every job. A thorough examination and analysis of all your grinding problems comes *before* any Peninsular recommendations.

Because of this exhaustive examination, made right at your plant by Peninsular engineers, you can be sure that the wheels you get from Peninsular are the most efficient for your conditions—for your machines, your methods, the materials you grind and the finishes you need.

So don't try to make savings by buying cheaper wheels. Peninsular can make *greater* savings for you by increasing wheel-life and stock-removal and lowering dressing costs—we'll stake our reputation on it!

Call in a Peninsular engineer *soon*.

The Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit 7. *Sales Offices:* Chicago, Philadelphia, Buffalo, Cleveland, Pittsburgh, Houston, St. Louis, Cincinnati.

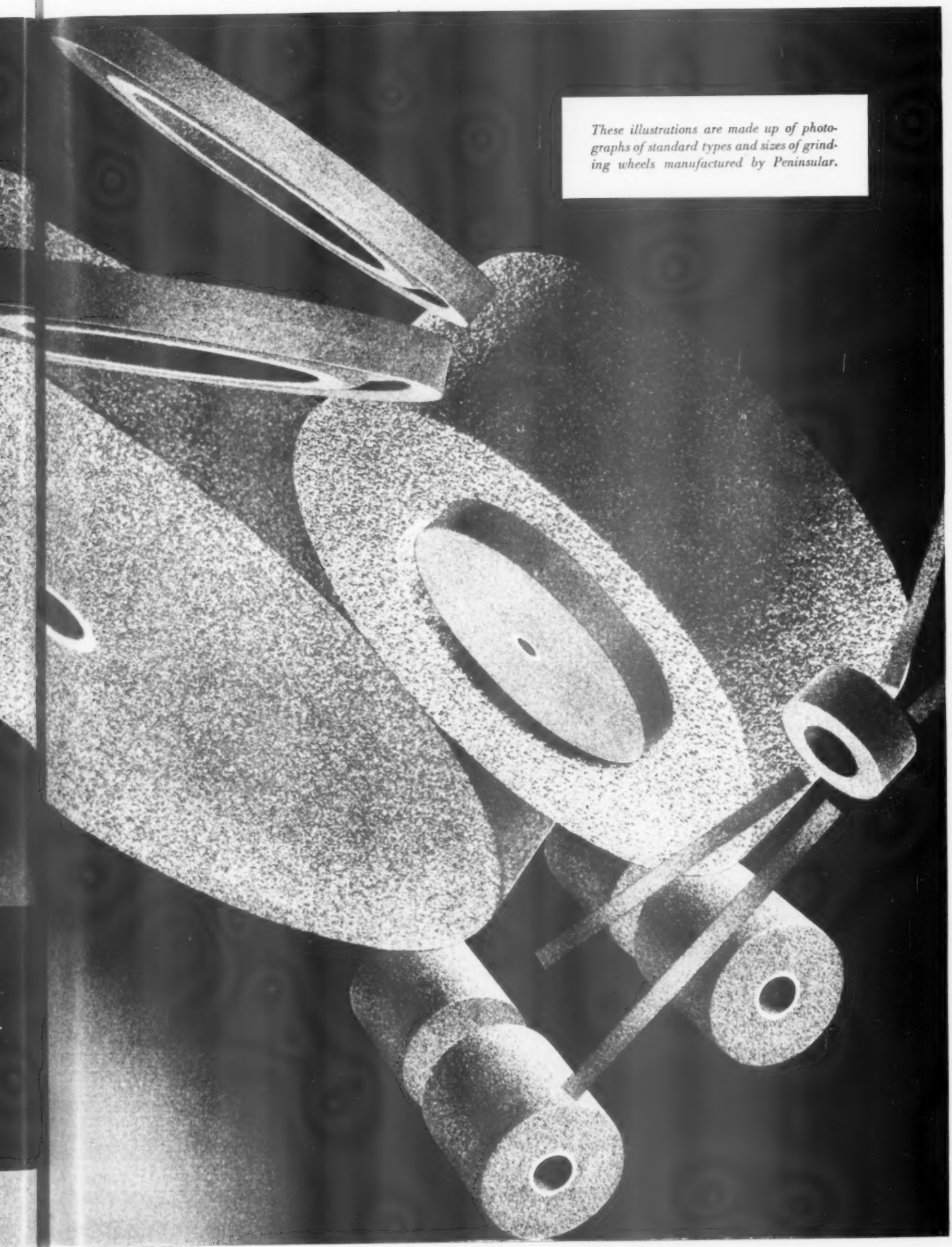
PENINSULAR

INDIVIDUALLY PENINSULAR *ENGINEERED*

GRINDING WHEELS

SINCE 1889

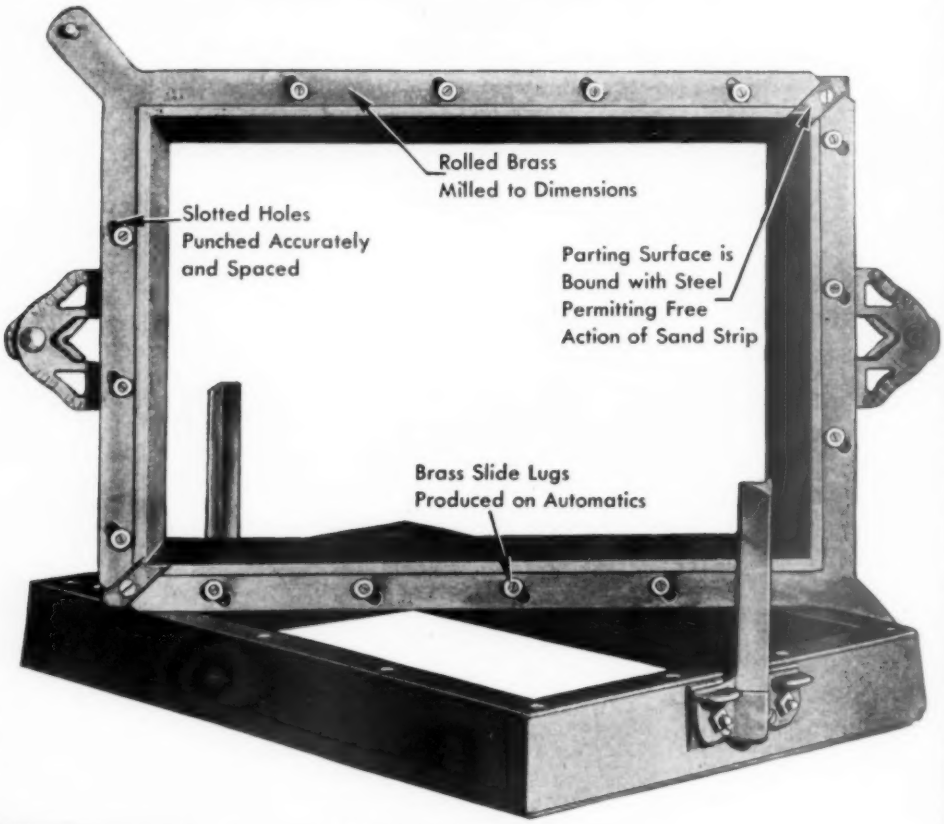
SPECIALISTS IN RESINOID BONDED WHEELS



These illustrations are made up of photographs of standard types and sizes of grinding wheels manufactured by **Peninsular.**

Now » » a BIG improvement in foundry flasks!

DIAMOND introduces Precision-made, 100% machined sand strips.



PROMPT DELIVERY

* *Increased production facilities, ample supplies of materials permit us to give prompt delivery.*

Write for

BULLETIN "F"

for complete details on this outstanding new line of fine foundry flasks.

DIAMOND

Telephone 2553 CLAMP AND FLASK COMPANY Richmond, Indiana

Designers of CORE PLATES, JACKETS, BANDS, FLASKS *since 1889*

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GRAY IRON FOUNDERS' SOCIETY, INC.

33 PUBLIC SQUARE • CLEVELAND 13, OHIO • PHONE PROSPECT 8480

A Report to the Leaders
of American Industry

Gentlemen:

Recent developments in the Gray Iron Foundry industry have been so noteworthy as to merit calling some of them to your attention.

First, technical progress has been very great, making gray irons available for many new uses and applications. For example, cast irons are now being made with tensile strengths up to 60,000 p.s.i. and even higher. An almost infinite variety of gray irons have been developed to meet specific requirements for components of greater strength, rigidity, damping capacity, machinability, etc.

Through advances in metallurgical and design engineering, better gray iron products are being made with actually less weight and bulk. More and more, foundries are adopting modern methods and are in a position to attract and hold better men.

Gray Iron Founders' Society, whose 600 members represent upwards of 75 per cent of the industry's tonnage, has launched a program of education and advancement that will be of far reaching importance.

The unmatched combination of engineering properties which modern gray irons offer, suggest broader consideration by every possible user.

Respectfully yours,

Howard A. Stockwell

Howard A. Stockwell
President

MAKE IT BETTER WITH GRAY IRON

MIX MORE SAND AT LESS COST

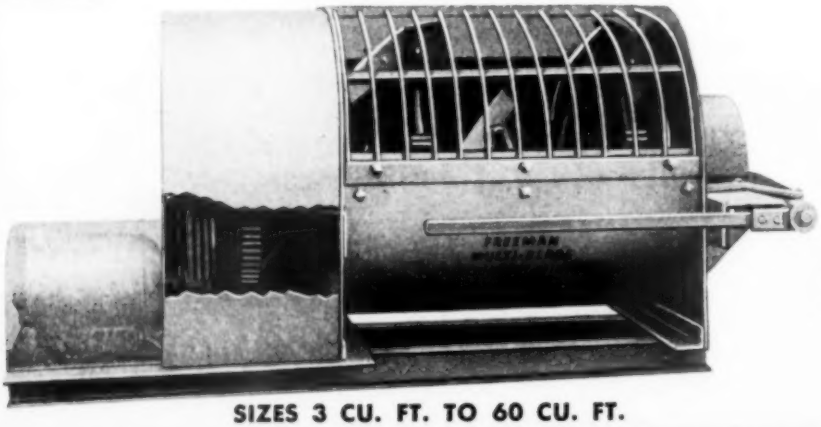
with a FREEMAN *Multi-Blade* MIXER

Here is the whole story on the new *Multi-Blade* Mixers that have proved they can do a better job for you at lower cost.

They are the only mixers with all these PLUS features as standard equipment:

- **More Blades**
- **SKF Ball Bearings**
- **Sealed Shaft**
- **Replaceable Liners**
- **Selective Discharge Location**

This new book contains complete information on improved foundry mixing.



Freeman "Multi-Blade" Mixer with V-Belt Drive. Note Safety Grill is standard equipment.

SIZES 3 CU. FT. TO 60 CU. FT.

Send a card today for your copy of this "New Horizons" booklet. It will be sent promptly.

THE FREEMAN SUPPLY COMPANY

PATTERN SHOP AND FOUNDRY SUPPLIES AND EQUIPMENT

TOLEDO, OHIO

Powder-Cutting

Steps Up Production of Stainless Steel Castings 32 Times . . .

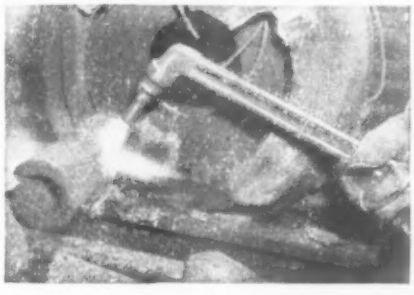
Riser cutting of centrifugally-cast stainless steel rings used to be a difficult and time-consuming job. In one foundry which used a boring machine, this operation took eight hours per casting. When powder-cutting was introduced, the time was reduced to approximately 15 minutes—a 32-fold increase in production.

In another foundry, powder-cutting was profitably used to remove $\frac{3}{8}$ to 1 in. of metal from stainless steel castings. The machining cost for this type of work has been $24.00 per casting. Substitution of powder-cutting brought the overall cost, including finish-grinding and chipping, to $7.53 per casting, and reduced the time from 8 hours to 1 hour. For an order of 60 castings, the foundry saved $988.20 and 360 hours of operating time.

If you have stainless steel or other oxidation-resistant metals to cut,

Centrifugally-cast rings of stainless steel are cut in 15 minutes time, increasing production 32 times.

LINDE's service engineers can show you how powder-cutting methods can be used with profit. Phone or write the nearest LINDE office.



Here, risers on stainless steel castings are being powder-cut—a time saving of 30 per cent over the former methods.

Linde
TRADE-MARK

THE LINDE AIR PRODUCTS COMPANY
Unit of Union Carbide and Carbon Corporation

30 East 42nd St., New York 17, N. Y. UCC Offices in Other Principal Cities

In Canada: DOMINION OXYGEN COMPANY, LIMITED, Toronto

The word "Linde" is a registered trade-mark of The Linde Air Products Company

Special Announcement BY Tabor

5 new de

One Year Ago...

we ran this "ad" announcing *five new features* on all of our Squeezers—a complete unification of the line. You foundrymen saw, read, and bought. And in the year since, all the reports coming in followed a pattern—"you gave us what we wanted!"

Anniversary Reminder—Count on tough, Tabor Squeezers to pull more than their share of *your* production load.

HERE are four machines you foundrymen invariably put "on the spot"—the top-speed, high production, don't-let-me-down spot. That's a tough assignment, calling for a tough machine!

So, Tabor engineers figure that nothing less than the *best* design will do for these vital molding units. From experience—63 years of it—they know what you want, *and here are the results:*

1. The squeezing unit, including guide, is completely enclosed—full protection against dirt and dust.
2. There are no piston rings on the squeeze mechanism—a source of down-time and maintenance expense gone.
3. Wear on squeeze cylinder is so reduced that it won't be necessary, within the conceivable life of the machine, to re-bore or replace this part.
4. It's now impossible, under any circumstances, for the squeeze piston to blow out—an invaluable safety feature.
5. Entire squeezing or jarring unit may be quickly detached from the machine—allows easy access for inspection.

Decide now to give your own production schedule the advantages of these well-engineered Tabor innovations. MOST TYPES OF THESE MACHINES ARE IMMEDIATELY AVAILABLE FROM STOCK.

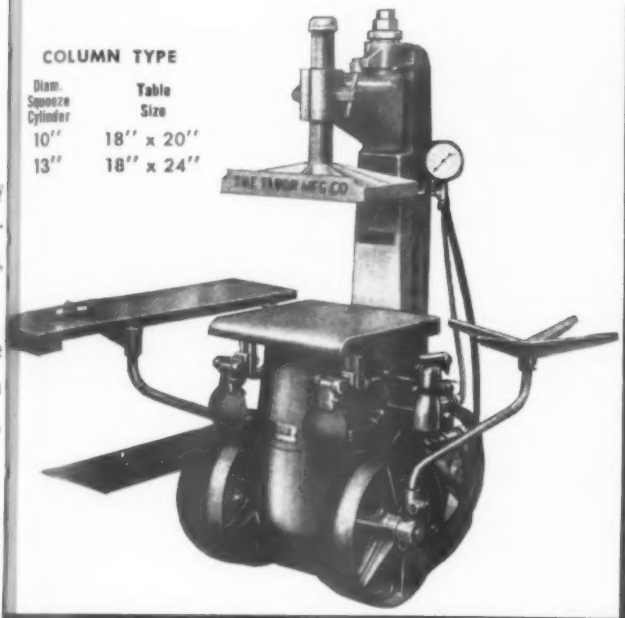
REPRESENTATIVES

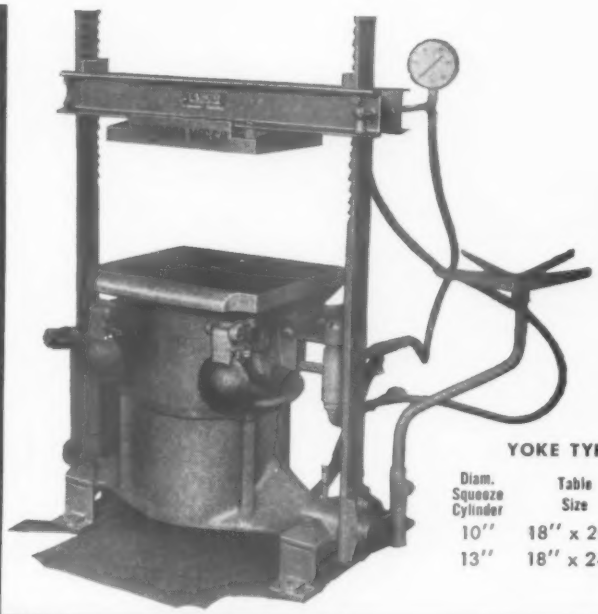
SNYDER FOUNDRY SUPPLY COMPANY LOS ANGELES, CALIFORNIA • SNOW & GALGIANI, 533 SECOND ST., SAN FRANCISCO 7, CALIF. • CARL F. MILLER & COMPANY, SEATTLE, WASHINGTON • M. W. WARREN COKE COMPANY, 1017 OLIVE ST., ST. LOUIS 1, MO. • E. R. FROST CO., INC., MINNEAPOLIS 14, MINN.

den features mean lowest maintenance . . longest life for these Jar Squeezers

COLUMN TYPE

Diam. Squeeze Cylinder	Table Size
10″	18″ x 20″
13″	18″ x 24″





YOKE TYPE

Diam. Squeeze Cylinder	Table Size	Space Between Uprights
10″	18″ x 20″	32″
13″	18″ x 24″	36″

TOP-SQUEEZE TYPE

Diam. Squeeze Cylinder	Table Size
10″	16″ x 19″

(Also available in portable or portable sand-straddler types)

CANTILEVER TYPE

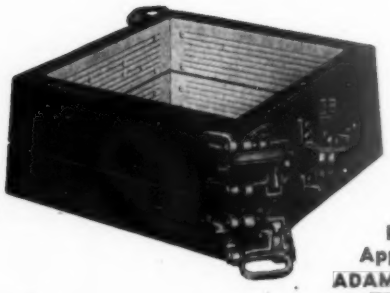
Diam. Squeeze Cylinder	Table Size
10″	18″ x 20″
13″	18″ x 24″

The **TABOR** *Manufacturing Co.*

SINCE **1884** MANUFACTURERS OF FOUNDRY MOLDING MACHINES

6225 TACONY STREET • PHILADELPHIA 35, PENNA.

Patent No. 2066547
ADAMS ALUMINUM SLIP FLASKS



Patent Applied For
ADAMS CHERRY EASY-OFF FLASK

Patent No. 2055548
ADAMS STEEL JACKETS

Patent No. 2124639
ADAMS JACKETS
Cast Iron and Aluminum

ADAMS ALUMINUM UFSET

Here is the Complete line of FLASK EQUIPMENT

Specify ADAMS Foundry Equipment

For half a century Adams Flask Equipment has been recognized as a leader. Custom built by experts for strength and long life and utilizing the finest materials available, it has become an important factor in better molding practice. Whatever your requirements get in touch with Adams. Write for descriptive literature, today. THE ADAMS COMPANY, 800 Foster St., Dubuque, Iowa.

Cherry Snap Flasks
Cherry Slip Flasks
Aluminum Slip Flasks
Easy-Off Flasks
Cherry Presser Boards
Wood Bottom Boards
Steel Bottom Plates
Steel Jackets
Aluminum Jackets
Cast Iron Jackets
Steel Bands
Steel Upsets
Cherry Upsets
Aluminum Upsets

The ADAMS Company

ESTABLISHED 1883

MOLDING MACHINES and FLASK EQUIPMENT

DUBUQUE, IOWA, U.S.A.

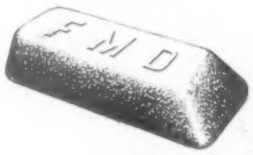
Federated METALS QUIZ

subject: FOUNDRY METALS

Q. The cost of metal in a casting is in direct proportion to the metal volume, although purchases may be made on a weight basis. What metal of the following group gives the most casting volume for a dollar: Magnesium, Aluminum, Zinc, Lead, Brass, Copper, Nickel, Tin?

A. Magnesium, which for $1 offers 77.5 cubic inches of casting. (Based on recent metal quotations.)

It is followed in order by Aluminum, 72.0; Zinc, 36.6; Lead, 16.2; Brass, 15.1; Copper, 14.6; Nickel, 9.0; and Tin, 4.0.



Whatever your foundry metal needs, see Federated first . . . for red and yellow brasses; tin bronzes; manganese, aluminum and silicon bronzes; nickel silvers; aluminum, magnesium and zinc-base alloys; deoxidizers and hardeners.

Friendly Federated servicemen are ready to assist you with any foundry problems. Extensive laboratory and research facilities are available when scientific help is necessary. Sales offices are conveniently located in 25 cities across the nation.

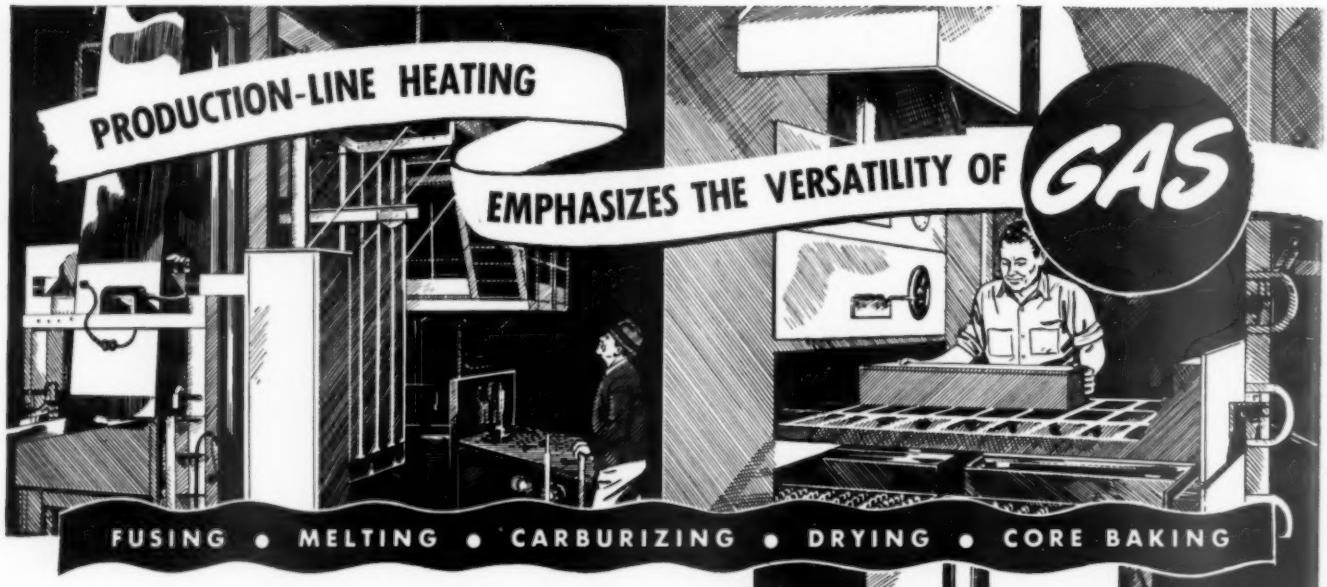
For a valuable, free 52-page book on the metallurgy of copper-base alloys, write for "COPPER-BASE CASTING ALLOYS." F-91

Federated METALS

DIVISION OF AMERICAN SMELTING AND REFINING COMPANY
120 BROADWAY NEW YORK 5, N.Y.

Federated first in the non ferrous field FMD

OFFICES IN CITIES ACROSS THE NATION



These are the tasks for GAS—these and hundreds of other industrial heat processing requirements. In fact, modern Gas Equipment has proved its superiority in virtually every industrial production-line heating application.

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- **ECONOMY**—the fuel and the modern equipment are economical, the production cost per piece amazingly low.
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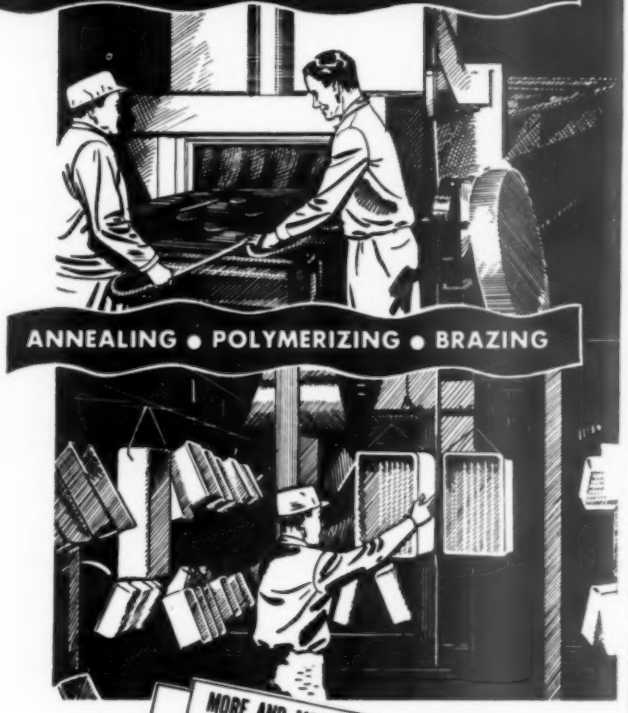

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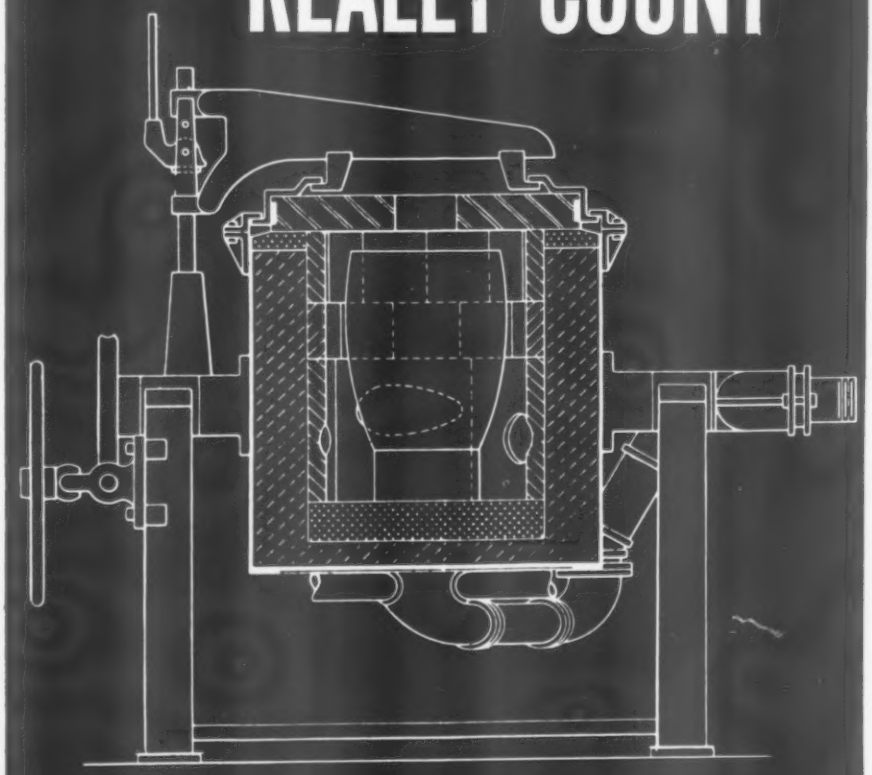

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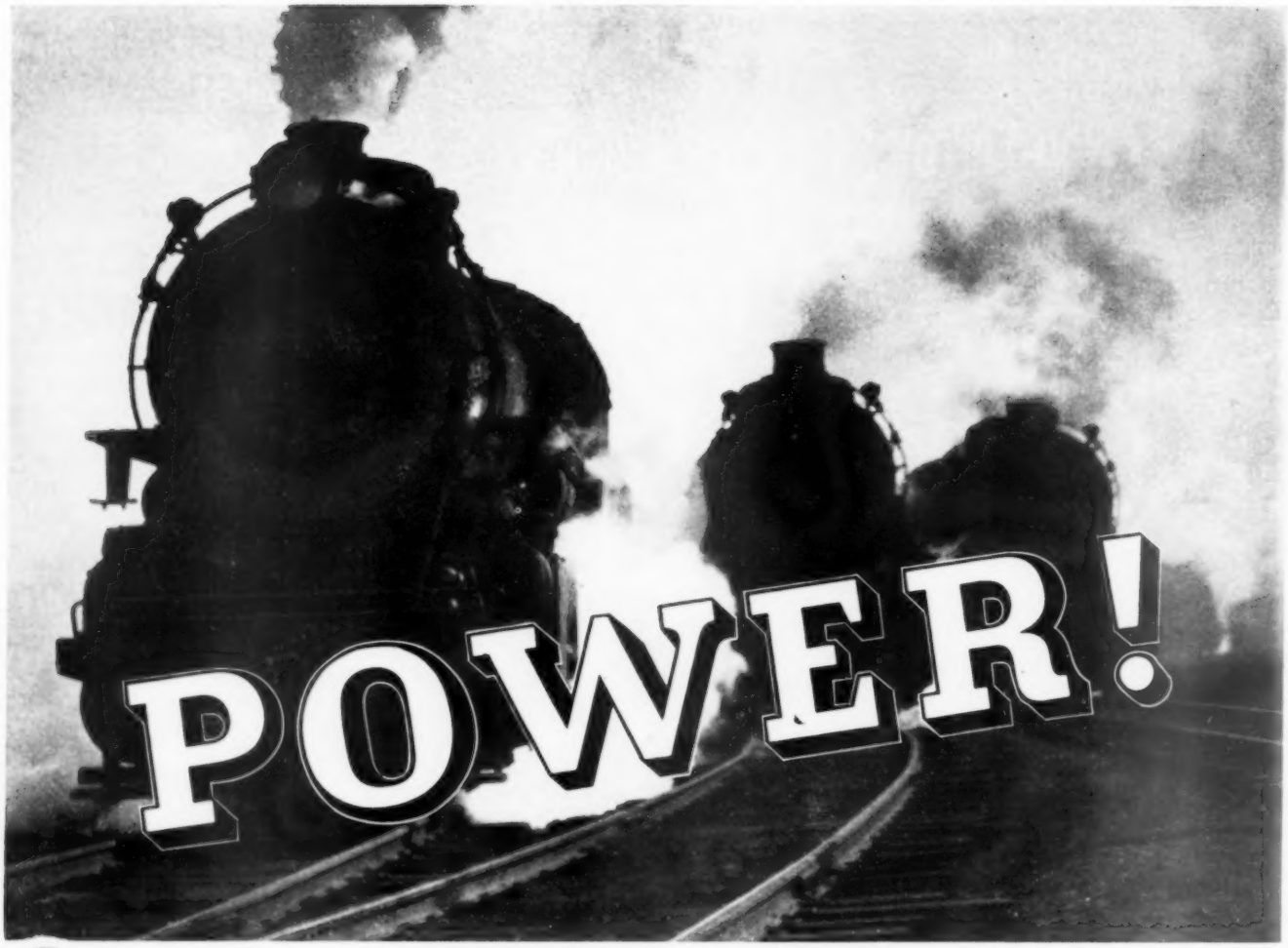

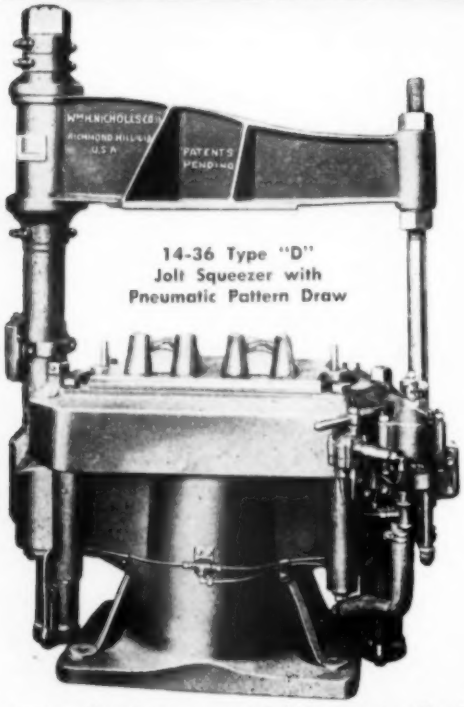

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10-inch cylinder

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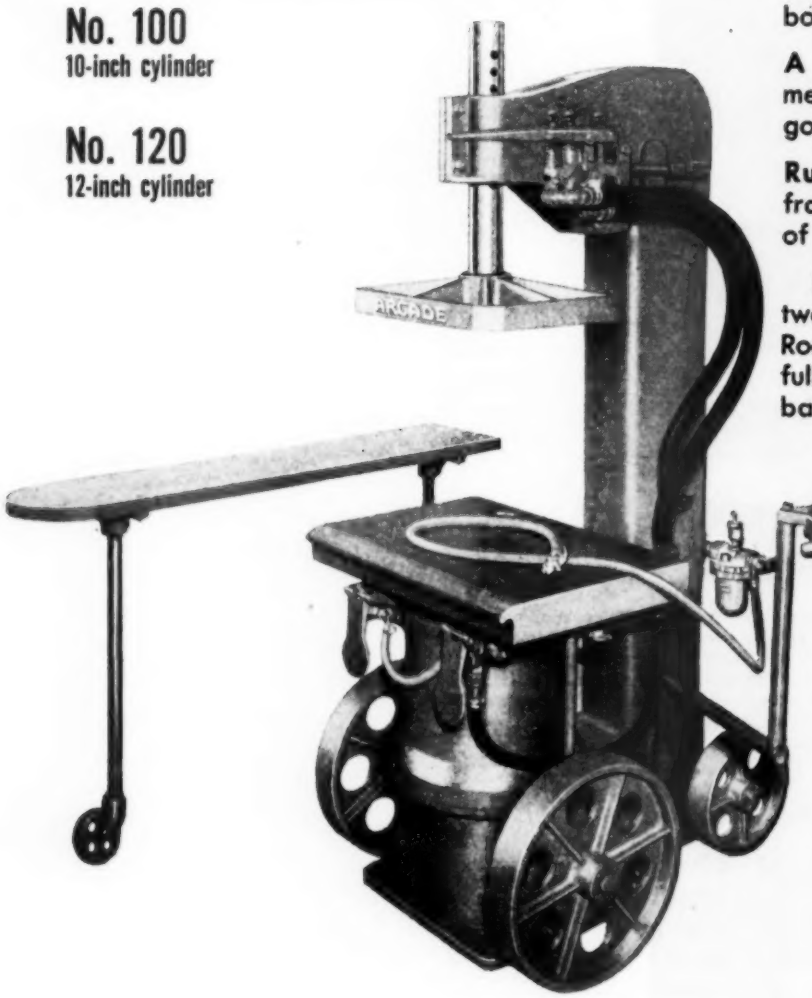

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Interchangeable cylinders—easy to convert from 10-inch jolt cylinder to 12-inch or vice versa.

Easy to operate—perfect balance and fine quality anti-friction bearings minimize manual effort, prevent fatigue, enable the molder to produce the maximum number of molds.

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A minimum of working parts means "low maintenance"—always good news to a plant superintendent.

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Back of this modern machine are two stout reputations—Arcade's and Rockwell's. Into it is built Arcade's full understanding of foundry needs, based on 65 years of successful foundry operation and a half-century of manufacturing good molding machines.

And the name Rockwell is a dependable guarantee of stability, leadership in research and efficient service.

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Munitions Board Appoints Foundry Advisory Group

WHEN the foundry industry was being pushed around during the war, many foundrymen resolved that those situations should not be repeated. In the past two years leadership of the American Foundrymen's Society, Foundry Equipment Manufacturers' Association, Foundry Facing Manufacturers' Association, Gray Iron Founders' Society, Malleable Founders' Society, National Founders' Association, Non Ferrous Founders' Society and the Steel Founders' Society of America, working through the National Castings Council, have undertaken to gain recognition in Washington of the basic character of castings, whether it be in peace or in war.

Because the Munitions Board of the Military Establishment occupies a position of great importance in planning for any national emergency, the foundry industry first carried its story to that organization.

Throughout this board, from the top on down, the industry found men possessing a fine appreciation of the need for castings. Officers with experience in the field, in our Pacific bases, in the various yards and arsenals, and in industrial procurement, had first hand knowledge of the importance of castings. These officers have been most co-operative in working with the industry to place foundries in a position to render maximum service to the nation in time of emergency.

Now the Board has announced the selection of the following men to serve on its Foundry Industry Advisory Committee: Gen. Donald Armstrong, U. S. Pipe & Foundry Co., Burlington, N. J.; George W. Cannon, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.; Collins L. Carter, Albion Malleable Iron Co., Albion, Mich.; F. Kermit Donaldson, Machined Steel Casting Co., Alliance, O.; O. L. Earl, Acme Aluminum Foundry Co., Chicago; F. Ray Fleig, Smith Facing & Supply Co., Cleveland; John E. Galvin, Ohio Steel Foundry Co., Lima, O.; E. W. Horlebein, Gibson & Kirk Co., Baltimore; Thomas Kaveny Jr., Herman Pneumatic Machine Co., Pittsburgh; Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va.; A. J. McDonald, American Steel Foundries, Chicago; Wilson H. Moriarty, National Malleable & Steel Castings Co., Cleveland; Thomas W. Pettus, National Bearing Metals Corp., St. Louis; Frank E. Shumann, Lehigh Foundries Inc., Easton, Pa.; Walter L. Seelbach, Superior Foundry Inc., Cleveland; David B. Shannon, Somerville Iron Works, Chattanooga, Tenn.; James H. Smith, Central Foundry Division, General Motors Corp., Saginaw, Mich.; Frank G. Steinebach, The Foundry, Cleveland; Fred S. Wellman, Wellman Bronze & Aluminum Co., Cleveland; and J. Donald Zaiser, Ampco Metal Inc., Milwaukee.

In activating this committee, the Munitions Board has taken an important step in planning for the procurement of castings in any emergency.

Frank G. Steinebach

Editor

THE FOUNDRY— WHEREVER METALS ARE CAST

Electric Oven Annealing

OF MALLEABLE IRON CASTINGS

By F. W. JACOBS
Assistant to Plant Manager
Lake City Malleable Inc.
Ashtabula, O.

AT THE time of construction of the defense plant at Ashtabula, O., early in 1944 which was leased and operated by the Lake City Malleable Co., Cleveland, the annealing department was considered unique in that the 16-ton, two-chamber, car elevator type ovens being employed were the largest of that type ever built by the General Electric Co.

Although the department, including the control room, covers approximately 30,000 sq ft, or about one-sixth the total plant area, it is compactly arranged, as may be seen in Fig. 3.

In all, there are six 16-ton units and one 4-ton unit, the total of which allows an economical anneal of 100 tons of malleable castings per day. The 4-ton oven is a miniature of the 16-ton ovens in construction and operating principles and is used for special work, experimental work, or as extra capacity for the annealing department when running at peak production. For purposes of this article, the 16-ton ovens will be discussed.

Each 16-ton unit consists of two oven chambers (Fig. 2), one for the high temperature portion of the annealing cycle and one for the slow cooling, low temperature portion of the annealing cycle. As may be seen in Fig. 3, two oven units are serviced by one car-track. There are five oven cars for each pair of units, four of which during capacity operation will be raised up into the respective chambers during anneal, the fifth car being on the track for cooling, unloading and reloading.

Each oven occupies a floor space 32 ft 3½ in. x 11 ft 6 in. and is 27 ft ½-in. high. The elevator motor, speed reducer, drive gear and hoisting drums are all located on the superstructure on top of each oven and can easily be reached by means of steel ladder and cat walk. One advantage of this type of installation is that the floor areas are left clear and unobstructed, allowing great freedom in the movement of castings, baskets and containers during loading and unloading.

Car Puller—The cars are moved on the track by means of an electrically driven car puller consisting of a continuous link chain which rides in a channel in the center of the track. The power unit, which consists of a sprocket gear, speed reducer and motor, is set in a pit in the floor at the loading end of the track and covered by a steel floor plate, thus leaving the loading area free from obstruction. There is also a sprocket gear located in a similar pit at the opposite end of the track over which the chain rides.

The sprocket gears are equipped with take-up bolts set through tension springs which enables the chain to be kept taut at all times. The motor drive coupling is equipped with two shear pins. An overload or obstruction on the tracks will create sufficient load on the drive gear to shear the pins, cutting off the power to the drive motor. The cars are equipped with pawls or dogs which are dropped into the chain link when it is desired to move them.

Elevators—Each chamber of a unit is equipped with a sturdy elevator consisting of two heavy frames, one on each side of the oven, which support the two ends of the car and which ride on the column supports of the oven chamber as the load is ascended to the oven. The frames are elevated simultaneously by means of cables and pulleys so connected to a motor drive on top of the oven that the two opposite cables of each side on the oven wind on a common drum Fig. 7. The elevator motors are equipped with limit switches which govern the maximum load, the down

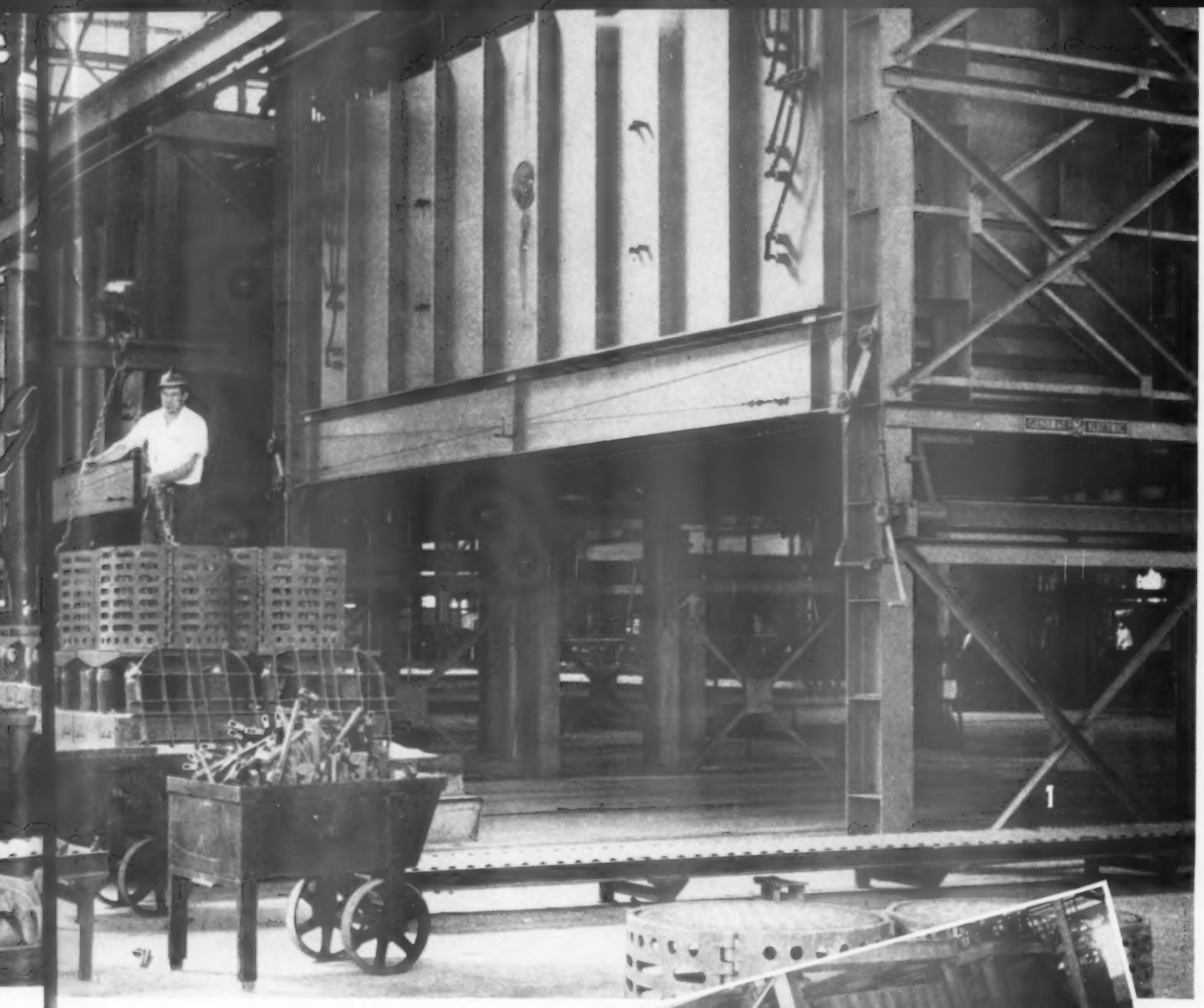


Fig. 1 — Unloading oven charge in grinding department at Lake City Malleable Inc., Ashtabula, O.

Fig. 2—High and low temperature chambers of one oven unit

Fig. 3—General view of annealing department showing arrangement of six ovens

and up limits of the elevator travel, and the amount of slack in the cables (Fig. 4.)

Total lifting capacity may be stated as follows: Maximum uniformity distributed load on hearth plate —352 lb per sq ft; total working area of hearth—122 sq ft. Including 32,000 lb of work and 11,000 lb for baskets, grids, etc., total load on hearth would be 43,000 lb. Adding to the hearth load 7000 lb for the elevator and 30,000 lb for the car gives a total lifting load of 80,000 lb. Lifting speed is 6 ft per minute. The cars are locked in the oven by means of a lever arrangement, as may be seen in Fig. 2. Car movements are controlled by pushbutton arrangements set at safe working distances from the ovens.

Crane Equipment—Loading of the oven cars is done adjacent to the hard iron department, and unloading is done adjacent to the grinding room, thus giving a progressive flow of work. Both loading and unloading areas are serviced by overhead 1-ton capacity, floor-operated traveling cranes. Each crane is equipped with an electromagnet, the direct current for which is supplied by a motor generator set located on the crane carriage.

Oven Lining—The high temperature and low-temperature ovens of each 16-ton unit are lined with insulating firebrick with a back-up lining of diatomaceous insulating block and powder. No mortar is used for sealing joints of the brick except on the bottom rows of facing brick which extend 2½—3 in. into the oven and which serve as buffer brick to prevent any overhanging castings or misplaced baskets from hitting the elements without first hitting the facing brick as the load is elevated. These joints are sealed with an air-setting cement.

The dimensions of each oven of a unit are nearly the same except that the height of the brickwork in the low temperature oven is greater to make allowance for proper clearance above the cooling tubes. Inside dimensions are as follows: High-temperature oven—length 23 ft 1 in., width 6 ft 10 in., height 6 ft 9 in. with an arch rise of 11 ft and radius of 6 ft 10 in.; low temperature oven—length 23 ft 1 in., width 6 ft 10 in., height 7 ft 4½ in. with an arch rise of 11 ft and radius of 6 ft 10 in.

The wall lining thickness in each oven is 15 in., the outer lining being composed of standard 9-in. insulating brick set lengthwise, making a 4½-in. insulating thickness. The balance of 10½ in. is composed of insulating block and powder. Arches are composed of No. 1 arch insulating brick and standard 9-in.

Fig. 4—Maximum load limit switch is shown in foreground, slack cable limit switch in center, general hoist assembly in background

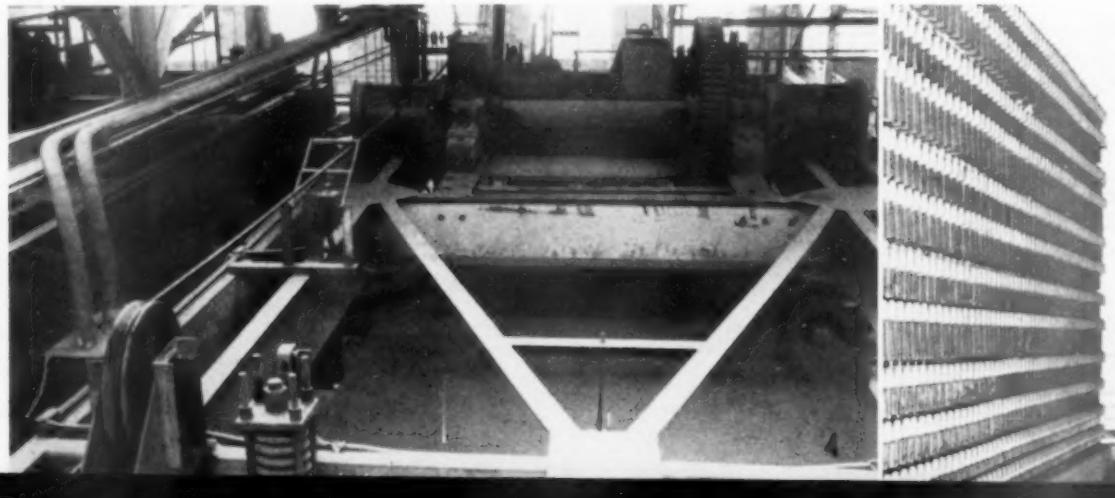
Fig. 5—Inside view of high temperature chamber illustrating layout of heating elements

Fig. 6—Positioning basket of castings on oven car

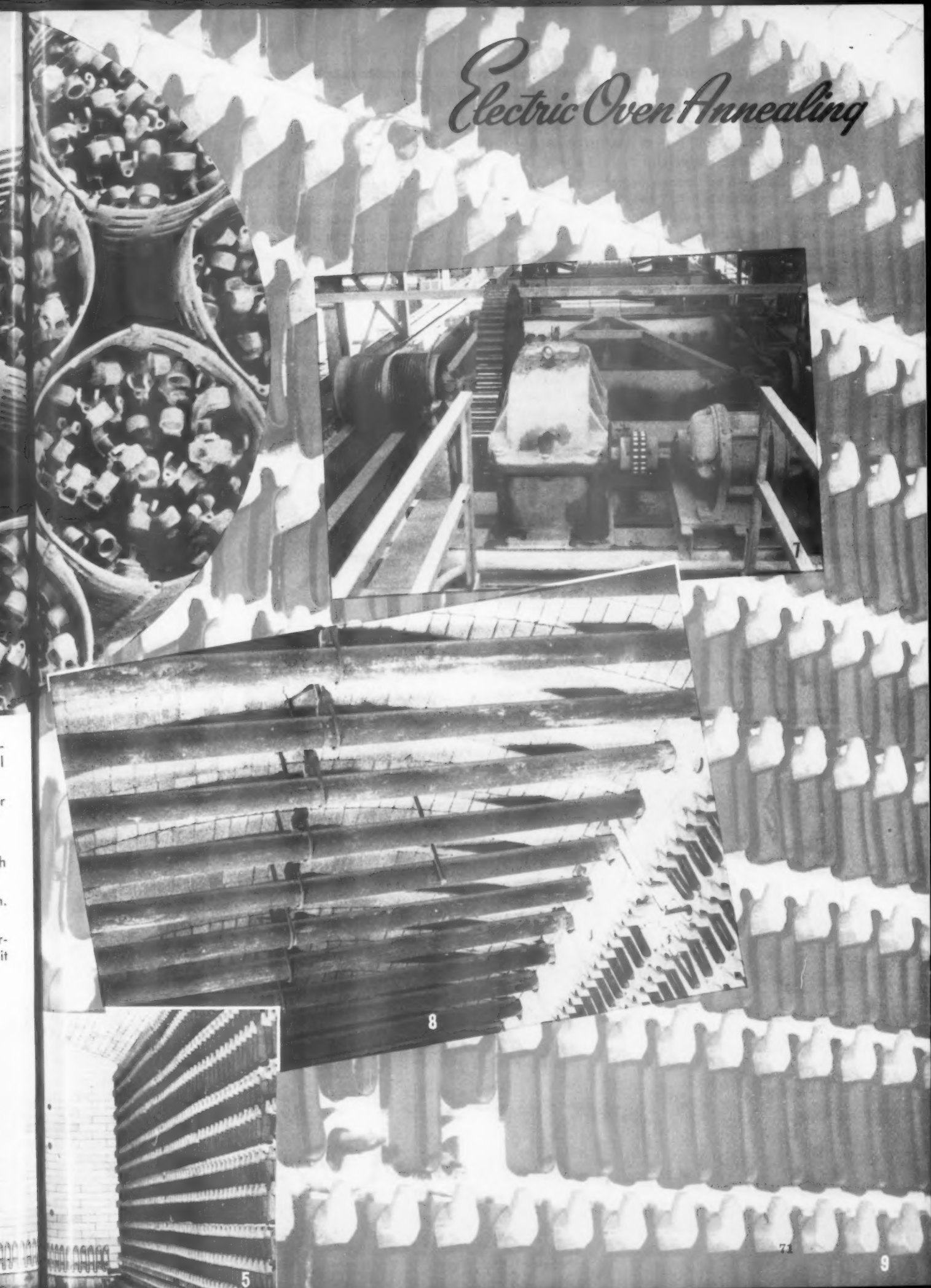
Fig. 7—Elevator hoist assembly. Cables on each side of the oven wind on a common drum

Fig. 8—View in low temperature oven showing 3⅛-in. diam centrifugally cast alloy cooling tubes

Fig. 9—High temperature chamber illustrating arrangement of thermocouples and temperature limit fuses on top and bottom heating zones



Electric Oven Annealing



straight insulating brick to give desired radius. Arch insulating brick thickness is 9 in. The 9⅝ in. space in the high-temperature oven and the 7¼ in. space in the low-temperature oven between the arch brick and metal casing on top of the oven is filled with natural insulating material.

Car Lining—The hearth working length on each car is 21 ft 10 in. x 5 ft 7 in. The base of the car is constructed with 14½-in. lining, the upper 4½-in. being insulating firebrick, the lower being natural insulating brick and powder. Brick is laid without mortar or fire cement wash. There are 16 grids, each set on four columns and about 12 in. from the brick bottom. Each grid post is surrounded by a metal casing which is packed with insulation powder. Distance from the floor to top of the grids is 4 ft 4¾ in. The car is equipped with a 4¼ x 9¼-in. sand seal which runs entirely around the base of the hearth. A pure 50 mesh silica sand is used in the sand seal. When the car is elevated to the oven, the sand seal on the car fits snugly up to a vertical metal plate which effects a suitable atmospheric seal.

Heating Elements — The high-temperature oven contains 12 rows of Cr-Ni heating elements (Fig. 5), which are supported on porcelain hangers. The low temperature oven contains nine rows of heating elements similarly mounted. In addition, the low-temperature oven contains thirty-two 3⅛-in. diam centrifugally cast alloy cooling tubes (Fig. 8), which run from side to side through the oven chamber directly above the load. The tubes are connected to a blower system on one side, the exhaust side being open. Air is blown through the tubes and does not contact the atmosphere in the oven.

Baskets and Grids—Baskets and grids are cast in sections using 35/15 chrome-nickel alloy, the sections of the baskets being joined by pins of the same alloy. Basket dimensions are 24⅜ in. high x 30⅜ in. diam. Although the initial cost of each basket and grid is about $250, a majority of the baskets and grids have been continuously used for the last four years with practically no maintenance except for the welding of occasional cracks which result principally from rough

Electric Oven Annealing

handling. The basket and grid cost therefore has been less than $1 per ton of castings annealed.

Temperature Control—The ovens are so wired that each unit is made up of several zones as follows:

1. Low temperature oven zones
   (a) Two bottom zones each rated at 105 kw, 460 v, 3 phase, 132 amp.
   (b) One top zone rated at 90 kw, 460 v, 3 phase, 113 amp.
2. High temperature oven zones
   (a) Two bottom zones each rated at 210 kw, 460 v, 3 phase, 265 amp.
   (b) Two top zones each rated at 200 kw, 460 v, 3 phase, 250 amp.
   (b) Two top zones each rated at 200 kw, 460 v, 3 phase, 250 amp.

Temperature control of each zone is independent of the other. Temperatures are measured by means of nickel—nickel molybdenum thermocouples mounted in chrome-nickel alloy protective tubes which are inserted through the oven wall as shown in Fig. 9. Thermocouples are so arranged that there is one thermocouple for each zone, one mounted through the center of each car, and one all-zones couple mounted through the center of the roof in the low temperature ovens. The car thermocouple lead wires are connected to the recording instrument lead wires running from the control room by means of a plug and socket connection mounted on the under structure of the car. As the car is elevated to or lowered from the oven, the plug is inserted or removed from the socket, thus making or breaking the thermocouple lead wire connection.

Adjacent to the thermocouple tubes in each zone of the oven and as also shown in Fig. 9, is located a gold wire temperature limit fuse which serves to break the power connections to the elements in case of excessive temperature. The gold wire melts at 1800° F.

Temperatures and oven cycles are maintained with the aid of recording and control instruments which are mounted on panel boards set in semicircular fashion in the control room (Fig. 13). Each panel contains all the necessary instruments for control of one pair of ovens as follows: High-temperature oven—three indicating control instruments, one recording control instrument; low-temperature oven—three control instruments, one all-zones recording control instrument, one car recording control instrument, one interrupter.

The high-temperature recording control instrument records the car temperature plus the bottom zone temperature of the oven. The low-temperature recording instruments record the all-zones temperature on one chart and the car temperature on the other chart.

In setting the temperature of the cycle, the zone instruments are set at the necessary temperature to bring the car temperature to the desired range. All records and control of the cycle are based, however, on the actual car thermocouple readings.

In the second stage of anneal, a close control can be maintained in the cooling range through use of the interrupter, which may be set at any rate of cool per hour ranging from 1° to 25° F per hour. On automatic control the blowers are automatically turned on if the rate of cool tends to be slower than desired or, on the other hand, heat is automatically supplied if the rate of cool tends to be faster than desired.

All instruments are operated on 220-v circuits.

Operation Cycle—The cycle of anneal is set with regards to iron composition allowing for ample variance, maximum temperature in first stage anneal, power demand, section size and type of castings to be annealed, weight of oven charge and, of course, production requirements.

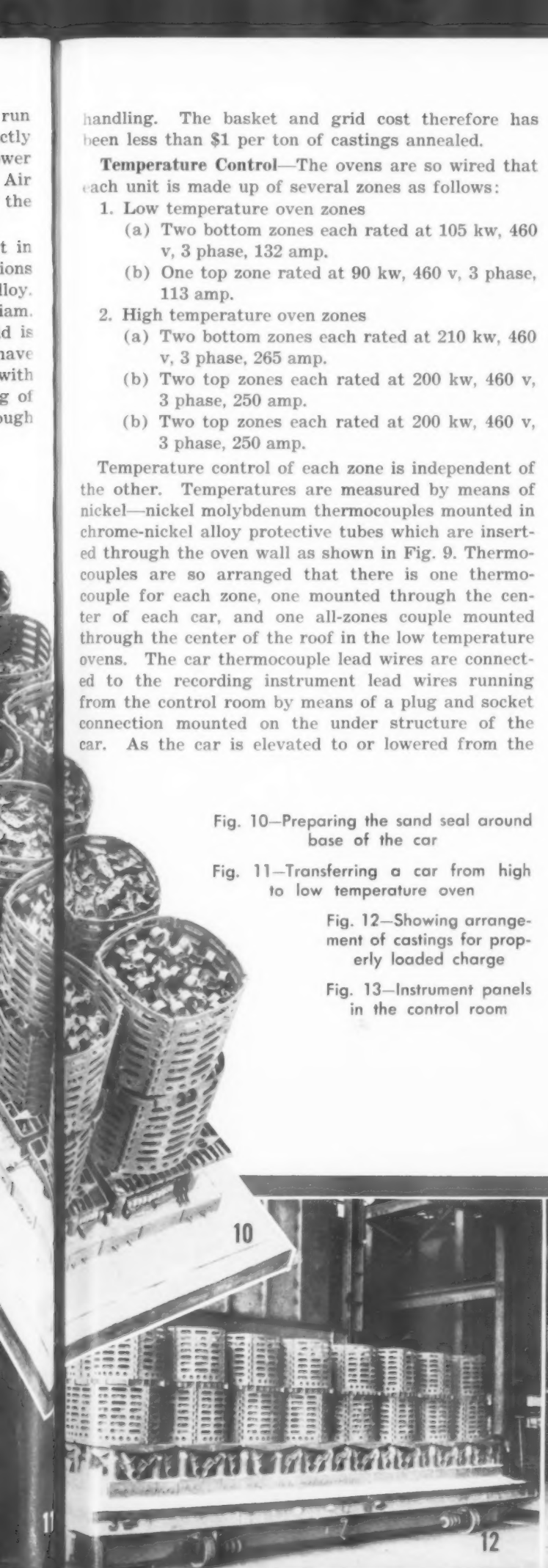
The plant is producing a high silicon iron with an average carbon content of 2.40 per cent before anneal. Based on iron analy- (*Please turn to page* 129)

Fig. 10—Preparing the sand seal around base of the car

Fig. 11—Transferring a car from high to low temperature oven

Fig. 12—Showing arrangement of castings for properly loaded charge

Fig. 13—Instrument panels in the control room



Centrifugal

AT SUCH rotational speeds as are recommended for true centrifugal pouring, which run up to as high as 1400 or 1500 rpm, any lack of balance in the mold immediately will cause it to vibrate violently. Once vibration starts, it cannot readily be prevented, except by reducing the speed of rotation. Therefore, the mold itself, must be in proper balance and the steel running into it must be evenly distributed over its surface throughout the pouring operation. It is for this reason that so quick-freezing a metal as steel must be poured into a rapidly revolving mold, so that none of the metal may solidify at any one point and throw the mold out of balance.

When molten steel is poured into a metal mold, the latter will expand quite rapidly, and its diameter will increase as it heats up. However, the steel poured into it, which conforms to the inside diameter of the mold as long as it is still liquid, contracts in solidifying and continues to do so as it cools below its freezing point. Therefore, the casting would rapidly lose

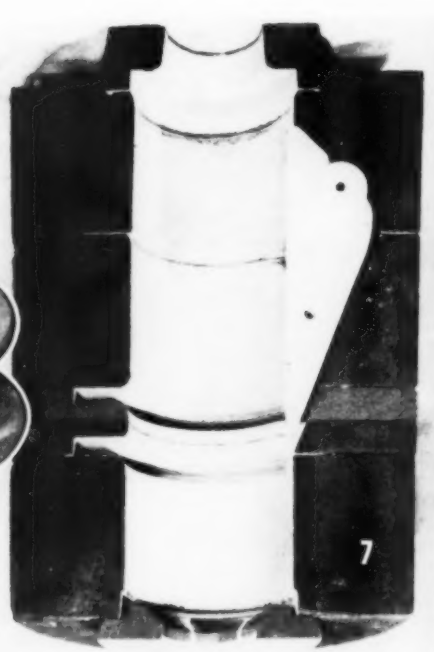
Fig. 6—Landing gear hinge pivots, cast and fabricated

Fig. 7—Cross section of dry sand mold for hinge pivot

Fig. 8—Track wheel castings made semi-centrifugally

Fig. 9—Universal sprocket gives yield of 65 per cent. Note bleeder at tip of teeth for gas esape

Fig. 10—A stage in assembly of alternate drag and cope cores for sprocket castings



By JOHN HOWE HALL
Consultant
Swarthmore, Pa.

Casting of Steel

Further details on the true centrifugal process and a discussion of the semi-centrifugal method of producing steel castings are included in this second of three articles. The first article appeared in the August issue

contact with the mold walls, were its contraction unopposed, as would be the case in a stationary mold. Such a failure of the first-solidifying layers of the casting to fill the mold obviously would so reduce the friction between mold and casting that the latter would slow down and its still fluid contents would tend to accumulate in a mass at the bottom of the mold, throwing the latter out of balance.

At the high spinning speeds usually employed in true centrifugal pouring, however, the successively freezing layers of steel are undoubtedly stretched by their own centrifugal forces and that of the still unfrozen metal inside of them, so that they continue to fill the mold at least during the greater part of the time required for the whole piece to freeze. Any embryonic tears in the solidifying layers are filled by the still fluid metal inside them, and thus a homogeneous skin is maintained. It is undoubtedly partly for this reason that it is necessary to use such high rotating speeds while the mold is being filled, since lower speeds would not set up high enough centrifugal forces to expand the first-frozen layers and maintain contact with the mold walls.

The conditions in this case are not the same as those when the last portions of a heavy-walled tube are solidifying, since solidification and expansion are simultaneous, and each layer increases in diameter instantaneously, before the metal has attained enough strength to resist the forces tending to enlarge it. However, to be completely effective this process must be gradual; that is, the chilling effect of the mold on the steel must not be too severe, and the steel must be fed into the mold slowly, so that each layer may solidify and expand against the metal outside it. If a heavy-walled metal mold is used, the steel poured in so rapidly that a thick layer solidifies in a very short time and a high spinning rate is maintained, the outside of the casting will be cracked open and the cracks may extend completely through the wall of the piece. This is more likely to occur with thick-walled than with thin castings, with too high a spinning speed, and with too rapid pouring. In practice, the proper combination of pouring rate, metal temperature and spinning speed usually has to be determined by experiment.

The metal molds usually preferred for short pieces, whether poured vertically or horizontally, are as a rule made of mild steel, though gray iron and alloy

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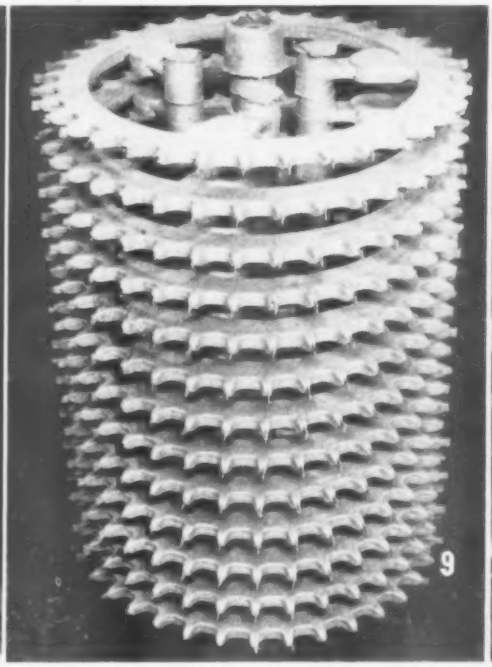
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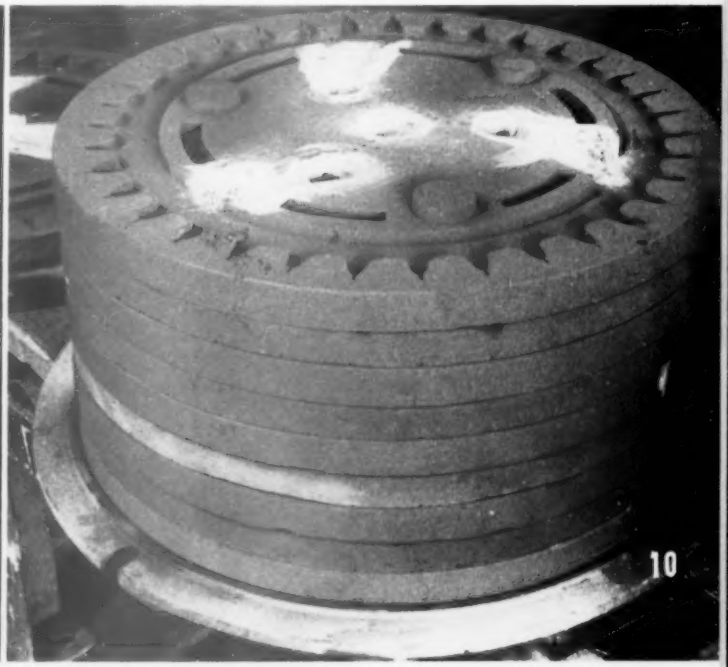
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steels or irons are sometimes used. To keep them at the desired temperature, and to allow any slight defects to be readily repaired, they usually are constructed so that they can be slipped into an outer casing attached to the driving mechanism. After pouring one or more castings, the mold is removed from this casing, and set aside to cool while another one is put in its place. This practice has been found to greatly extend the life of the molds. To keep the steel from running out of horizontal molds or rising over the edge of vertical ones, steel rings, so constructed as to be readily removable, are used to partly close the open ends of the molds. In some cases, rings of clay brick or, ring-shaped cores may be substituted for the metal ones, and held in place by suitable clamping devices.

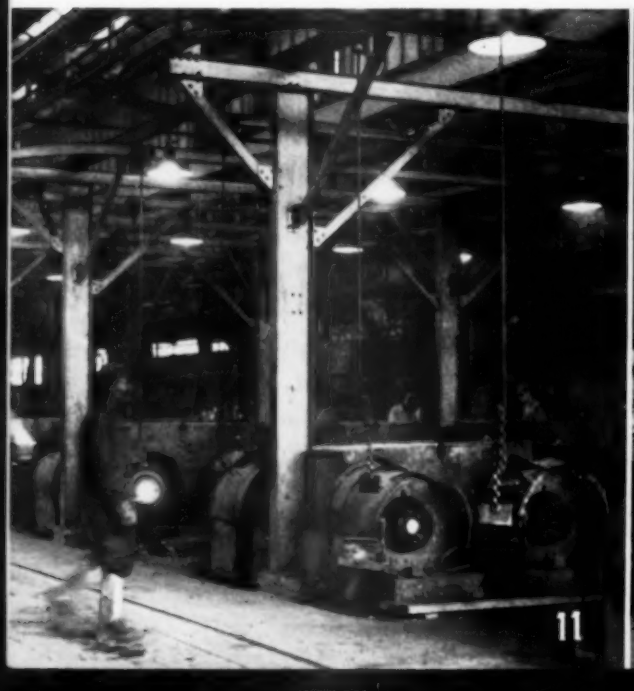
Vertical-axis machines are usually set in rows and poured from ladles carried on overhead trolleys. At some convenient point, usually at the end of the line of machines, a platform scale is placed so that the right amount of steel may be weighed out in the small ladles, quickly transferred to the machines, and poured. Spinning devices in high production installations may be mounted around the edge of a turntable which revolves at a low rate of speed, so that the steel can be poured at one point, the castings taken from the molds at a position further around, the molds prepared for pouring at a third station, and so on.

When the steel is to be poured into horizontal molds, the casings that hold the latter usually are bolted to face plates at the ends of short shafts, which for convenience in driving are mounted two on a stand. As many of these are provided as are required to take care of the amount of steel that is to be poured at one time. In front of each mold is a pouring device like a funnel with a horizontal delivery spout, lined with refractory material and set on a pivot so that it can be readily moved out of the way after pouring. Steel from the main ladle is fed into smaller ones set on a scale, so that exactly the right amount of steel is poured into each mold. Unless very light work is being made, these pouring ladles are swung from overhead trolleys and quickly moved to each machine in turn. Fig. 11 from an article by C. K. Donoho[7] shows a typical layout of horizontal machines, and Fig. 12 from the same source shows the molds ready for cleaning and reassembly after the castings have been removed from them.

As soon as a casting has cooled enough to be loose in the mold, the latter is removed from the machine and another put in its place, ready for pouring. The closing ring is then removed from the mold just poured, the casting slipped out of it, and the mold set aside to cool. As a rule, no lining is used in these molds, but sometimes cylindrical cores may be slipped inside them to make castings of different diameters, without changing molds. Generally, however, a separate mold or molds are provided for each size of casting to be produced.

When the casting to be made is long, so that the steel has to flow a considerable distance in order to fill the mold, sand linings are required, and the casting is poured and spun in a horizontal position. The sand is rammed around a central pattern having enough "draft" to allow it to be drawn from the sand without tearing the mold. As the speed of rotation on these machines is quite high, the molds must be in nearly perfect balance to prevent them from vibrating. Therefore, the pattern has to be perfectly true, and must be so centered in the flask that the sand lining is of exactly the same thickness and density all the way around. To attain this condition with wood patterns and centering spacers is exceedingly difficult, and as a rule metal patterns are provided and arranged so that they can be placed in the flasks and withdrawn from them by mechanical devices which insure a perfectly concentric mold wall.

Ramming is sometimes done on jolt machines set in pits deep enough to bring the tops of the molds about at ground level, allowing the sand to be fed in readily while jolting proceeds. For any but fairly short molds, however, it is impossible to thus secure even ramming from end to end of the piece. Naturally, it is important that the sand should be evenly and tightly compacted, so that it will not cut away when the steel is first poured in, or "swell" at some point



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of its length and give an over-size casting. Jolters, therefore, are not really satisfactory machines for doing this work. Slingers, too, are unsatisfactory, as they cannot properly ram the sand in the deep narrow space between the flask wall and the pattern. The best way to ram these long flasks is with specially designed air rammers and provided with long bars and suspended by cables from overhead sheaves, so that they will reach to the bottom of the molds and can be gradually withdrawn as the ramming proceeds. The flasks meanwhile are rotated slowly by a mechanism that drives the base plates on which they are set. Attachments for centering the patterns at the top of the flask and guiding them as they are drawn from the sand, are handled by the men who direct the rammers and control the flow of sand from overhead hoppers into the molds.

Ends of the molds are closed by flat cores with a hole in the middle which fit into suitable seats in the sand of the mold wall. Cores are held in place by steel plates slipped in over them, and usually secured by keys driven from the inside of the flask toward the outside as shown in Fig. 15. In some cases, these closing cores may be held to one of the metal end plates by rods attached to the latter and sticking into the core. In that case, of course, the plate is set in the corebox in which the core is made, and the sand is rammed against it. It is possible in this way to form a part of the inside of the tube to a different diameter than that of the main part, but only a rather short core can be thus held in position in the mold and spun. The best known instance of using this device are the cores that form the bells of cast iron pipes.

Flasks used on long horizontal machines are of heavy-walled tubing, pierced with a number of holes to permit the escape of gas from the sand when the mold is dried and when the steel is poured, and are usually mounted directly upon supporting rollers. Near each end of the flask is a tire shrunk in place and trued up in a lathe which contacts the rollers. Usually one of the latter at each end of the machine is driven by a suitable mechanism, and one is an idler. Near the middle of the flask is a similar but narrower band, running between a pair of idler wheels, which prevents the flask from moving endwise. Heavy flanges are usually shrunk on at each end of the flask, to stiffen it and prevent the ends from being battered in service.

As a rule a pair of hold- (*Please turn to page* 228)

Fig. 11—Battery of horizontal spinner heads for casting cylinder barrels

Fig. 12—Molds ready for cleaning and reassembly

Fig. 13—Web type gear showing feed channels and center core

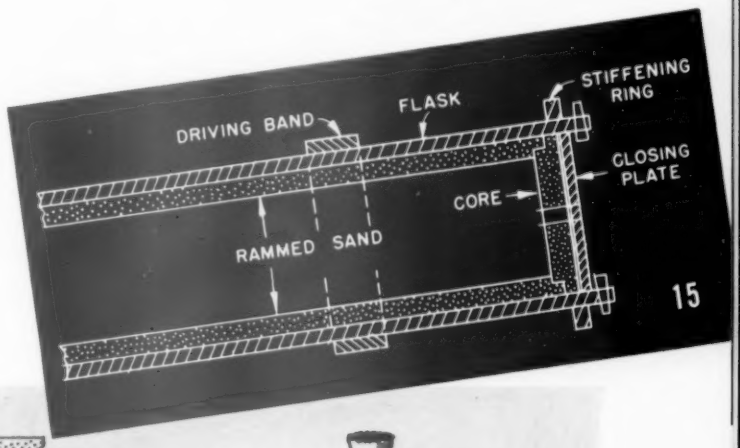
Fig. 14—Spoke type gear with gate cores

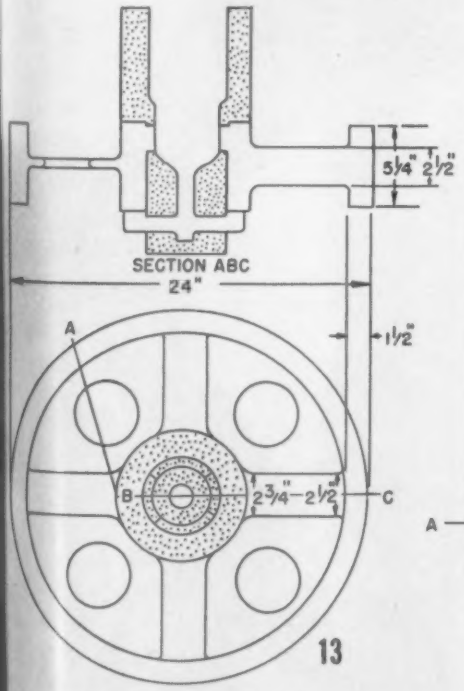
Fig. 15—Method of holding steel end plates in mold

Fig. 16—Gate attached to single point on hub

Fig. 17—Gate attached to two opposite points on hub

Fig. 18—Head covering entire hub including core





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AREA OF FEED CHANNELS 6.6 SQ.IN
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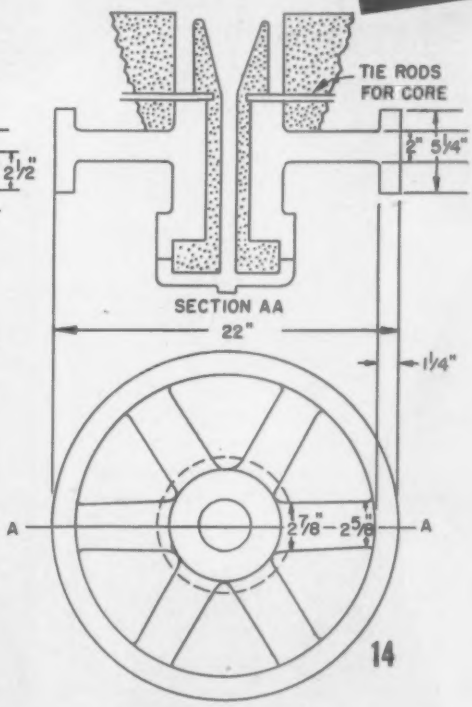

AREA OF RIM 6.6 SQ. IN.
AREA OF SPOKES 5.5 SQ. IN.
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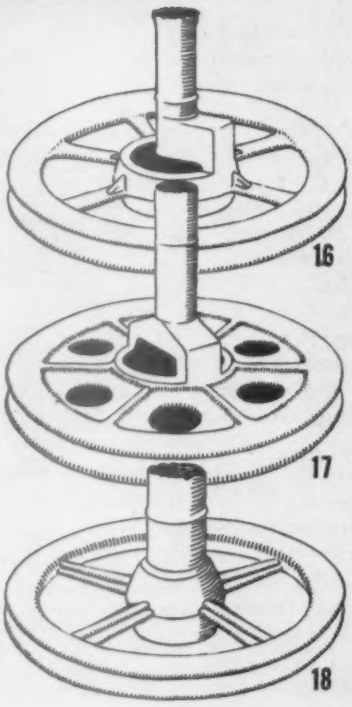


Fig. 1—Assembling mold for airplane centrifugal fuel booster pump

Fig. 2 — View of permanent mold foundry of Thompson Products Inc. showing small melting furnace at right front and row of holding furnaces. Large melting furnaces are in left foreground

Fig. 3 — Visual inspection of pistons

Fig. 4—Pistons descending from heat treating oven after completing eight-hour treating period

By ROBERT H. HERRMANN
Assistant Editor
THE FOUNDRY

Aluminum Pistons

IN PERMANENT MOLDS

OCCUPYING about 35,000 sq ft of floor space at the huge Thompson Products Inc. Tapco plant in Cleveland, that company's modern permanent mold aluminum foundry is a good example of cleanliness and efficiency. It is set up on a straight-line production basis and has a capacity of approximately 20,000 aluminum automobile and truck pistons daily.

Pistons made by the company are of two general types—a conventional slotted skirt piston and the company's patented steel-belted piston. Before the development of the steel-belted piston, all pistons made by the company were gated and poured at the top, and a large percentage of the pistons still are made in that way. One type of gate employed is a wedge-type combination gate, sprue and riser, which makes contact with the casting across the full diameter of the piston head. The other type is conically shaped and makes contact with the head of the piston at its center, through a circular opening.

During the development stages of the steel-belted piston, it was discovered that top pouring methods were unsatisfactory, causing metal flowing problems around the steel ring insert which is cast into the piston around the top of the skirt. Experimentation proved that a fan gate running almost the full length of the piston, starting at the head, gave the best results.

The steel belt is a continuous circle made of about $\frac{1}{8}$-in. diam wire, formed into a circle with a diameter slightly less than that of the piston as shown in Fig. 5. These belts are inserted into the piston mold by the operator just before the mold is closed for pouring. The belts are polished with graphite before delivery to the casting machine operators to prevent adhesion between the steel and aluminum. The graphite also serves as a lubricant between the steel belt and aluminum when the piston is in service. This is necessary because, although expansion of the belt and the cast iron cylinder are almost the same, the aluminum will expand more than the steel. Consequently, the skirt slides around the belt and causes the slot in the piston to close up slightly, thus leaving the steel belt in control of the circumference of the piston at the top of the skirt.

To prevent the belts from acting as a chill, they are heated in a small gas-fired stove just before insertion in the mold. These stoves are vertical tubes about a foot high with the gas burner at the bottom.

TABLE I—Aluminum Casting Alloys Employed

	MS-74	MS-75	MS-76	MS-94	MS-95	MS-96
Cu	1.5–2.0	1.5–2.0	5.5–6.5	2.5–3.5	3.0–4.0	1.0–1.5
Si	12.0–13.0	10.5–11.5	5.5–6.5	9.0–10.0	8.0–9.5	4.5–5.5
Mn	0.5–0.9	0.5–0.9	0.3–0.5	0.5 max	0.5 max	0.5 max
Fe	0.7 max	0.7 max	0.7–1.0	0.8 max	1.3 max	0.6 max
Mg	0.5–0.9	0.5–0.9	0.3–0.5	0.8–1.5	0.1 max	0.4–0.6
Zn	0.4 max	0.4 max	0.8 max	0.5 max	0.6 max	0.5 max
Ti	.....	.....	.....	.....	.....	0.2 max
Ni	.....	.....	0.5 max	0.8–1.5	0.5 max	0.5 max
Pb	.....	.....	.....	.....	.....	0.05 max
Cr	.....	.....	(Ca 0.005 max)	.....	.....	0.2 max
Sn	.....	.....	.....	.....	0.3 max	0.05 max
Other (each)	0.2 max	0.2 max	0.2 max	0.2 max	.....	.....
Other (total)	0.8 max	0.8 max	0.6 max	0.5 max	.....	.....

The steel belts are placed in the top of the tube, which has a diameter just slightly larger than that of the circular belt and holds the belts stacked one on top of the other. The casting machine operator removes the belts with tongs as they are needed, through a slot in the bottom of the tube.

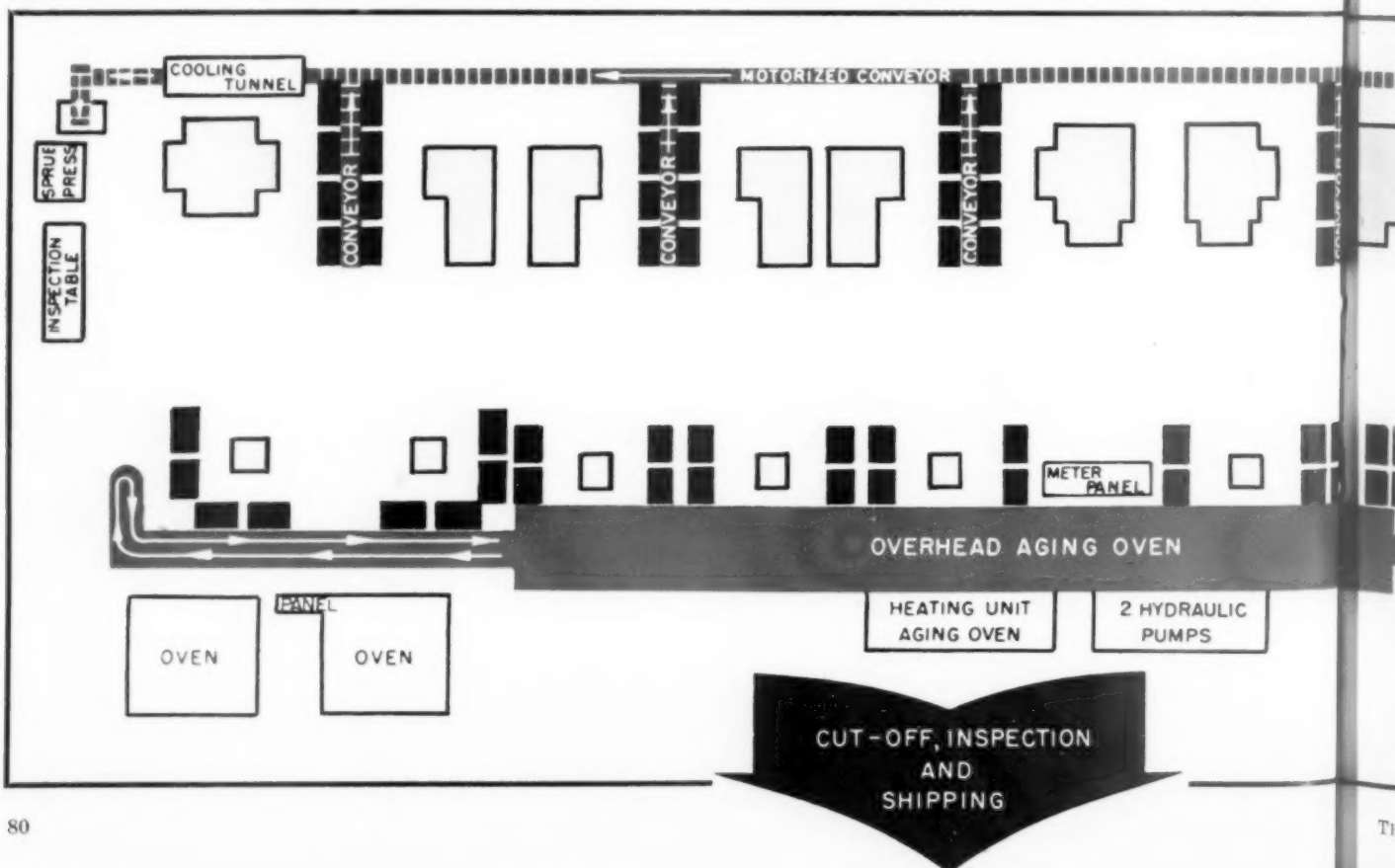
The company's foundry is laid out along two parallel aisles 224 ft long, running north and south. Sketch of the foundry layout is shown in Fig. 7. Raw materials move from the loading dock at the south side of the foundry, along an aisle where the castings are made and back on another aisle to the loading dock for shipment to the company's other Cleveland plant where all machining and finishing work is done, or for shipment directly to the customer who intends to do his own finishing work. Machining at one time was done at the north end of the foundry beyond the inspection tables, but the shop recently was moved to the other plant to make room for other Thompson operations.

The foundry is well lighted by a wall of glass and numerous overhead fluorescent lights. Fumes and excess heat are exhausted from the large gas-fired holding furnaces through hoods and pipes. Ventilation of the foundry is accomplished by pipes leading to grids in the floor around the casting machines and through openings in the base of roof-supporting columns. The ventilating air is warmed or cooled as required. Floor of the foundry is made of impregnated wood blocks, except the loading dock and the space around the melting furnaces, where it is concrete.

Raw materials are delivered to the foundry in cars rolled into the building on a railroad siding. The loading dock is level with the floor of the cars, and a fork lift truck is used for unloading the aluminum ingots which weigh 32 lb each and are delivered in bundles of 56 banded together with steel straps.

The greater part of the aluminum alloys used in the foundry is of four types listed in Table I as MS-75, MS-76, MS-94 and MS-95. Before these are released to the foundry for use, samples are taken of several ingots and prepared by the company's

Casting Aluminum Pistons



laboratory for analysis. Included in the laboratory equipment is a spectrograph for making routine analyses and facilities for making chemical analyses when special situations require the wet method. An additional check is made by pouring spectrographic pads from each furnace periodically during each week.

The different alloy ingots are marked with colored paint to simplify the furnaceman's job in melting the correct alloy to meet requirements of the job in current production.

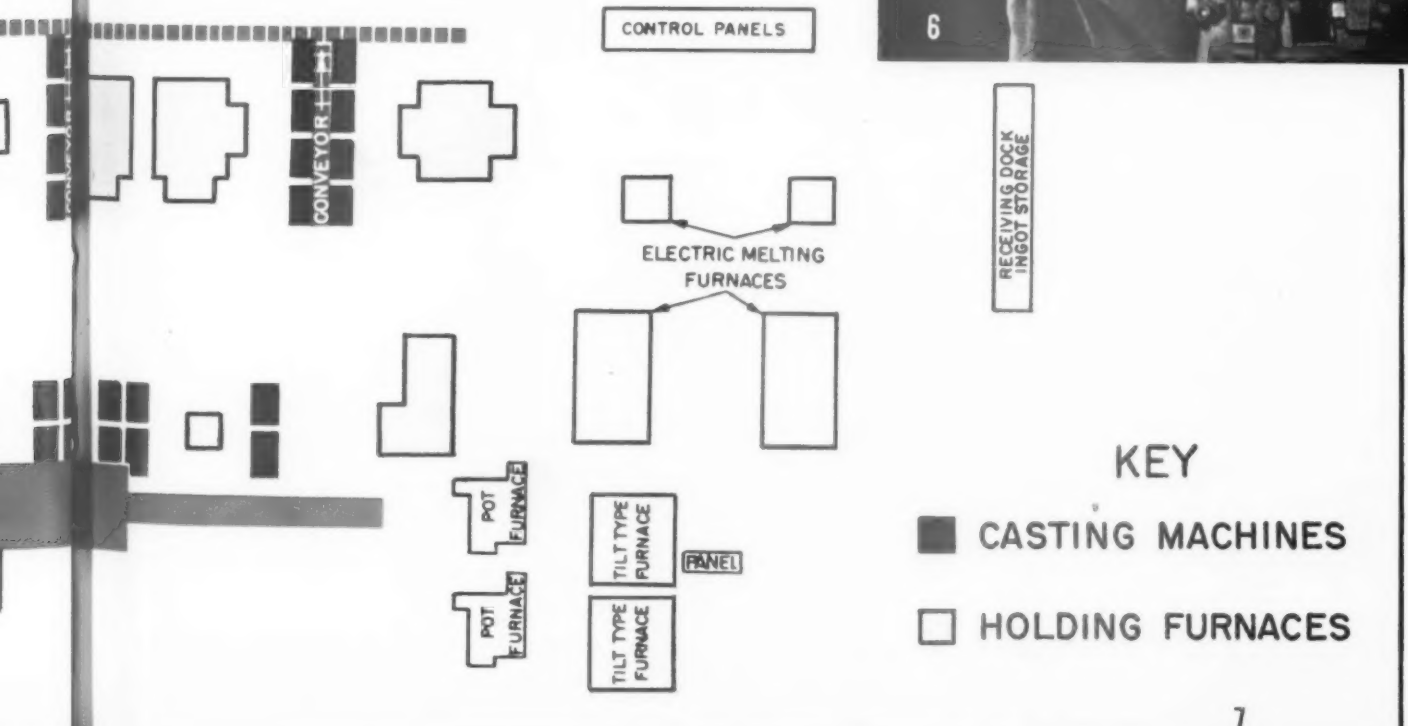
Melting and molding facilities are grouped along one aisle. Four electric induction furnaces are located immediately adjacent to the unloading dock, only a few feet away from the stacks of ingots. Two of these furnaces are rated at 150 kw with melting capacity of 750 lb per hr and are located on one side of the aisle. Opposite these furnaces on the other side of the aisle are two induction furnaces rated at 60 kw with melting capacity of 300 lb per hr.

The latter are tilting type melting furnaces and automatically bring the molten metal to 1300° F and hold it at that temperature. A carbofrax tube pyrometer inserted in the molten metal measures the metal temperature, which is recorded continuously at the furnace control panel. A 450-lb capacity bull ladle carried by an overhead traveling hoist transports molten metal to the holding furnaces where it is held at 1300° F until poured. This ladle services each of the 16 holding furnaces and makes a

Fig. 5—Cross-sectional sketch of steel-belted piston. Steel-belt insert is indicated by arrow

Fig. 6—Assembling mold for airplane fuel pump pressure regulator. Steel core in mold has ten parts

Fig. 7—Floor plan of the permanent mold foundry



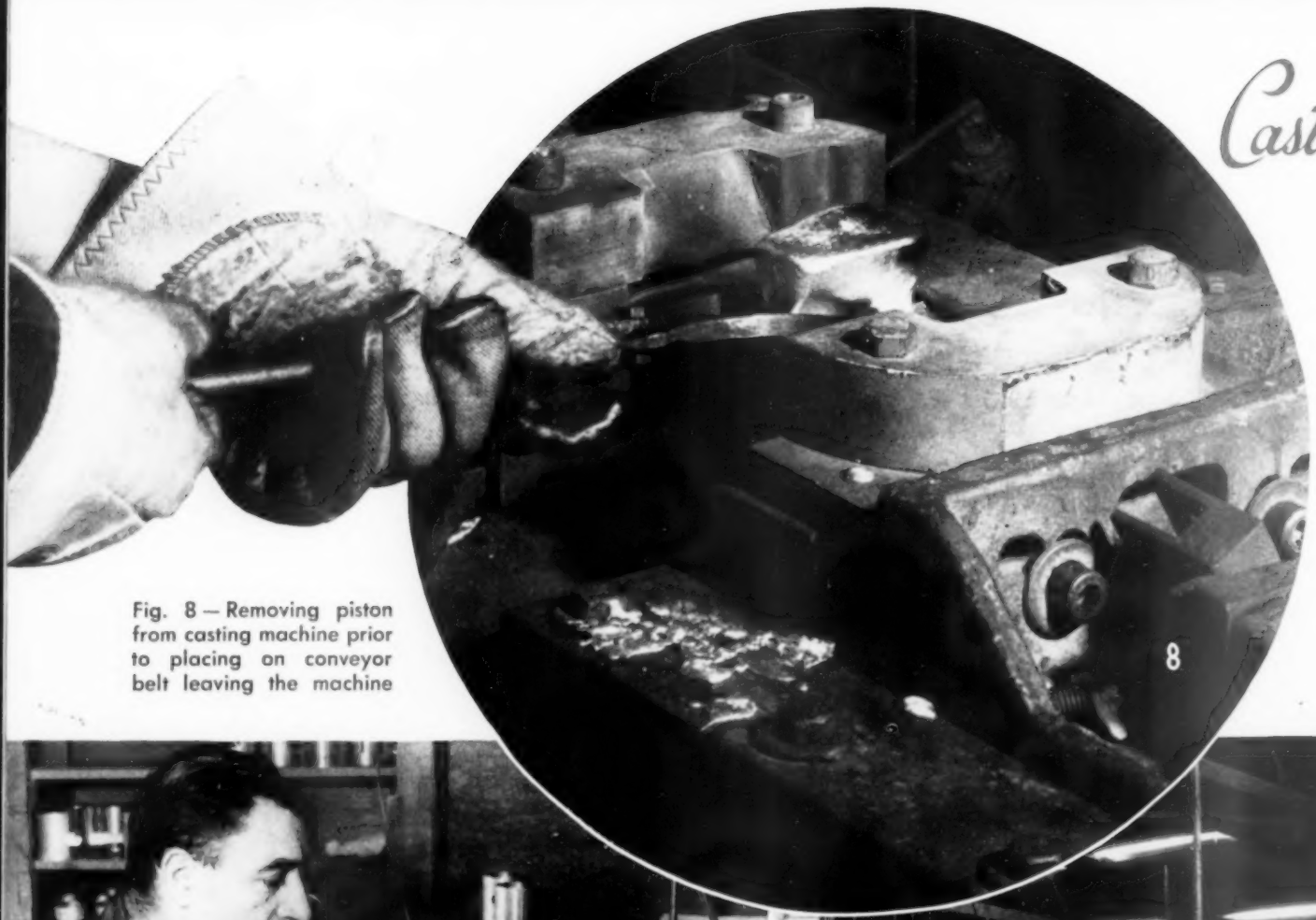
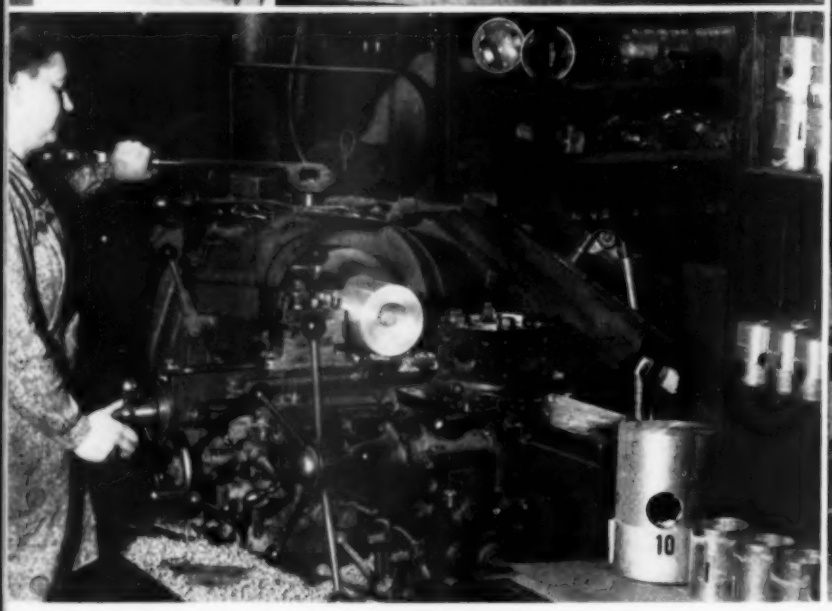
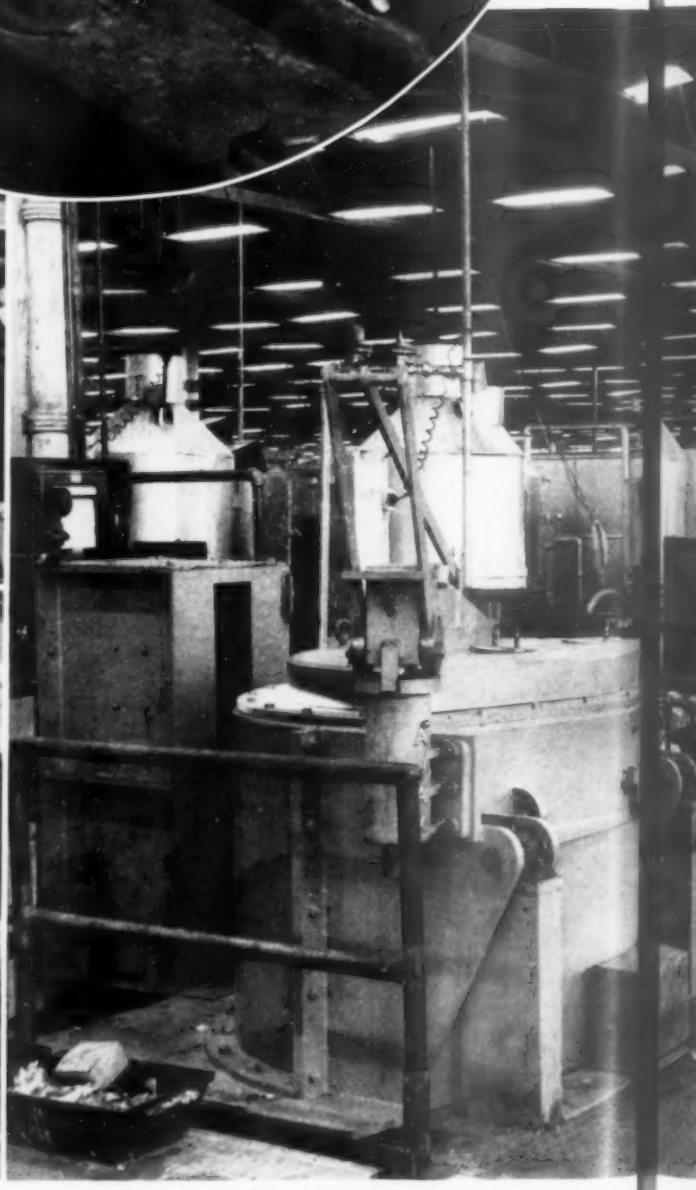


Fig. 8 — Removing piston from casting machine prior to placing on conveyor belt leaving the machine





ting Aluminum Pistons

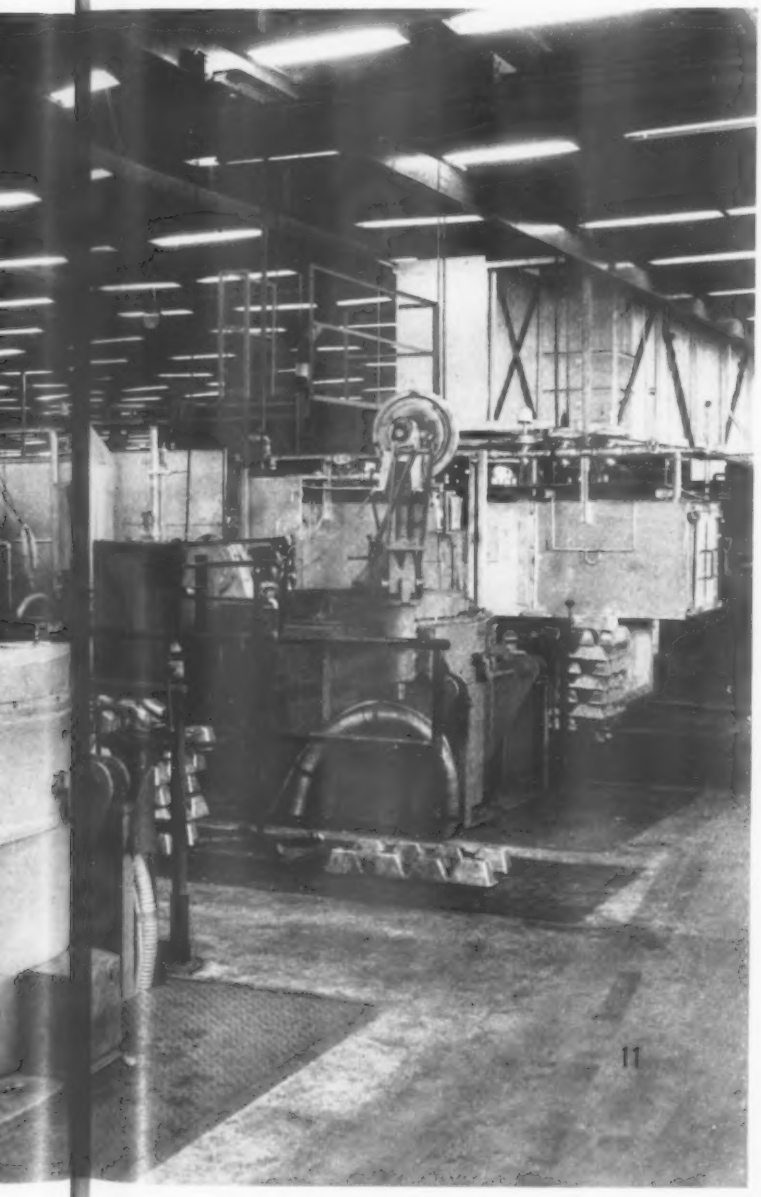
trip between melting furnaces and holding furnaces about once each half hour. Holding furnaces are gas-fired or electric induction type. Ten of them have capacities of 3000 lb and the six smaller furnaces have 1250-lb capacities.

Flux is added to the metal after it is poured from the melting furnace into the bull ladle. The flux consists of 55 per cent sodium chloride, 40 per cent potassium chloride and 5 per cent cryolite. The metal is degassed with nitrogen when necessary—usually in the spring and other periods of the year when atmospheric humidity is high and conditions are ripe for gas pick-up by the metal. Nitrogen is piped to each of the holding furnaces where an outlet with shut-off valve is located. A pipe with holes drilled in the lower portion of it is connected to the outlet with a rubber hose. Whenever degassing is required, the perforated pipe is inserted in the molten metal and nitrogen is passed through the bath. A meter measures the rate of nitrogen flow. The need for using nitrogen is indicated by porosity in the castings, and this is determined by inspection procedures to be discussed later.

Fig. 9—Checking dimensions of aluminum piston

Fig. 10—Turning down a piston prior to inspection for porosity

Fig. 11—Two large electric induction melting furnaces in foreground. Gas-fired scrap melting furnace (with short stacks) can be seen in background



Pistons manufactured by the company are cast in 64 casting machines. Forty of these machines are located in five double rows, four machines long, each row containing eight machines placed back to back. These double rows are approximately 20 ft apart. Power conveyors run the length of these rows along the backs of the machines. As castings are made, the operator lifts them off the machine with tongs and places them on the conveyor which carries the castings away from the main aisle to another conveyor running parallel with the aisle. This conveyor receives castings from each row of casting machines and carries them to the inspection tables.

Two of the large holding furnaces are placed back to back in the center of the 20-ft space between the rows of casting machines. Each of the holding furnaces is of 3000-ft capacity and services four casting machines.

Machines Operated Hydraulically

Molten aluminum is hand ladled from the holding furnaces into the molds on the casting machines where the pistons are cast with the head up. One man operates two of these machines, which are leased from the manufacturer.

The machines are operated by hydraulic pressure supplied from a central, constant pressure, variable output system which consists of an electrically driven pump and a hydraulic fluid supply tank. The system maintains a pressure of 225 psi which is sufficient to operate one-half of the casting machines maintained by the company. It was reasoned that since one man operates two machines, he can be opening or closing the mold on only one machine at a time. On this basis the hydraulic system has proved adequate. A motor and pump identical to that in the main system is maintained as a standby unit to be put into operation in the event of a breakdown.

Molds used on the casting machines are made of Meehanite and are split vertically through the center. Each half of the mold is mounted on a hydraulically actuated arm which opens and closes the mold halves. Molds are sprayed about once every 8 hours with a solution of whiting and water which deposits a thin refractory coating on the molds. Such coatings serve three purposes: They prevent cutting or eroding of mold surfaces by the molten metal; they eliminate adherence of the casting to the mold, and they control the cooling rate of the casting.

The steel core is made in (*Please turn to page* 130)

ANTHRACITE COAL Conserves

By F. J. FREDRIKSEN
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and

EDWIN BREMER
Metallurgical Editor, THE FOUNDRY

FOR some time the gray iron foundry of Westinghouse Electric Corp. at Cleveland, like many others, has been plagued by the double-barreled menace of short supply and poor quality of coke. Considerable thought has been devoted to possible ways and means to ameliorate these conditions. The problem has been complicated by the necessity of producing an iron which would meet definite physical characteristics of three distinct types of castings. Use of anthracite coal appeared to offer a bilateral solution, since it would conserve coke and provide a uniform quality fuel of slightly higher Btu content.

Major tonnage of castings produced at the Westinghouse foundry consists of electric resistance grids, motor end brackets and electric flatiron sole plates. All these are molded and poured on continuous units without any separation as to type. Since the final desired properties of the castings vary to a considerable degree, close control of the iron is necessary.

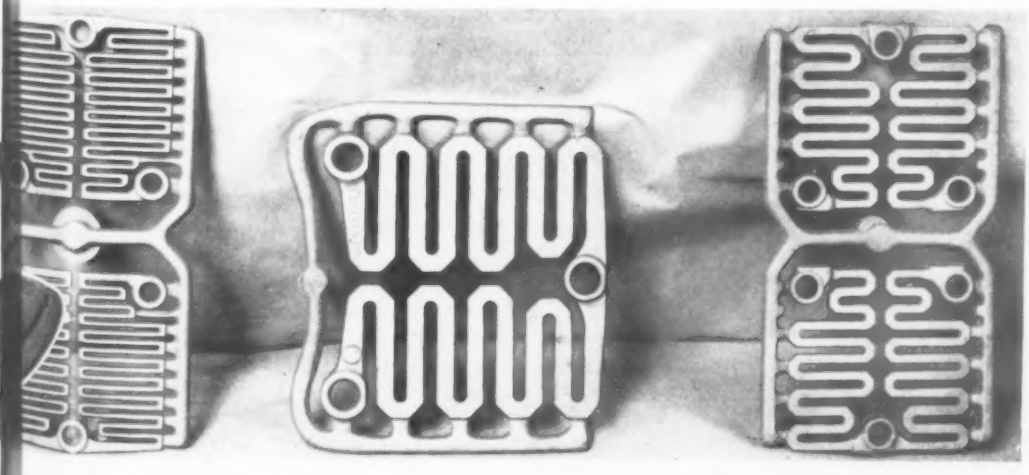
In case of the resistance grids, which range in section from 3/32-in. square in the light to ¾ x 2 in. in the heavy type, the electrical resistance is the controlling property. Resistivity of the iron varies with the grain structure, being low with a dense fine grain, and high with a coarse open grain. Hence, the practice is to maintain a grain structure in the iron which will satisfy both the light and heavy grids. The grids also must be tough and flexible to withstand severe jarring and jolting in service.

In the motor end brackets, which have section thicknesses from ¼ to 1/16-in. in the same part, the thin section must be readily machinable. Flatiron sole plates must be free from hard edges, and must have a dense structure which can be polished and electroplated.

While the typical analysis of the iron is about 2.70 per cent Si, 3.45 per cent TC, 0.60 per cent Mn, 0.20 per cent P, and 0.110 per cent S, control is based on the temperature, resistivity of grid castings, Rockwell hardness, file hardness, fluidity and chill depth. Temperature readings are taken hourly at the cupola spout, and long experience has dictated 2800°F±10° as the desired range. Every effort is made to keep as closely to 2800° as possible by making adjustments in the fuel splits, increasing or decreasing them as the temperature reading decreases or increases.

Resistivity, Rockwell hardness, file hardness, fluidity and chill depth are determined twice a day; in the morning on the first castings produced, and on first castings poured after the noon lunch period shutdown. Resistivity is determined electrically on grid castings; file hardness is determined on the 1/16-in. section of the motor end brackets; fluidity test employs the usual spiral in green sand and ranges from 30 up to as high as 42 in.; chill depth is determined on specimens ⅜-in. thick, 2 in. high and 3 in. wide poured in a core mold with the ⅜ x 3-in. face cast against an iron plate.

Iron is melted in two cupolas lined to 36 and 40 in. which are used on alternate days. Iron charges for both weigh 1200 lb and the fuel-to-iron ratio varies from 1 to 5 or 6. Bed height above the tops of the tuyeres is 52 in., and air is supplied by weight and ranges from 250 to 325 lb per minute. Cupolas are charged mechanically with crane and bottom discharge bucket. Pig iron, scrap and fuel are stored in hopper type bins and are weighed into the buckets, which are transported between the bins on a weigh-larry car. (*Please turn to page* 164)



Above — one of two cupolas in which anthracite coal is being used as fuel

Left — Typical castings produced from iron melted in coal-fired cupolas

Safe Operation of Portable

By R. B. FAIR
Abrasive Engineer
Simonds Abrasive Co.
Philadelphia

WHEN a portable grinding wheel breaks in use, one thing is practically certain. It is, or has been, subjected to a stress it is not designed to stand. That stress has been caused by (1) improper mounting, (2) too high speed, (3) incorrect use, or (4) abusive handling. The wheel will stand the two stresses it will be subjected to under correct operation—namely, centrifugal force at proper speed and reasonably heavy pressure against the work. But to those normal stresses add extraordinary stresses from one of the four causes mentioned, and something is apt to give. It is practically sure to be the wheel.

Operators of portable machines should be given thorough training in what causes wheel breakage, and frequently checked to see that they apply what they have been taught. It is not easy to get compliance, but the effort should be made.

A maker of portable machines wanted to get pictures of machines in use. Nearly all of the pictures that came in from users showed no wheel guard, although all of the machines had been equipped with guards when delivered. The operators had removed them because, they said, they could see better without them.

Faulty Mounting Practice

Faulty mounting practice probably causes more than half of all wheel breakage. So many faulty mountings are found that it seems as though operators feel that any old thing that will hold the wheel on the spindle for a minute or two will do.

A correctly mounted straight Type 1 wheel has two flanges, of the same size and both recessed to the same diameter, as shown in Fig. 4. It is clear, Fig. 5, how using flanges of different diameter, or of different diameter recesses, sets up bending stresses which fracture the wheel. The bearing areas of the flanges should be of the same amount and directly opposite each other, otherwise the smaller will concentrate its pressure near the wheel hole, and have no offsetting pressure.

Exactly the same effect is shown in Figs. 7, 8 and 9. The worst is using a nut alone, which concentrates all of the pressure at the hole. Using a washer, Fig. 8, is not a great deal better. The correct, identical flanges are used in Fig. 9. It is hard to believe that the operator who put on the outside flange in reversed position had ever been given even elementary instruction. The effect is the same as using flanges of different sizes—one of them unrelieved.

Most cup wheels used on portable machines have threaded steel bushings, Fig. 2. They are screwed onto the end of the threaded machine spindle which is equipped with a flange, Fig. 10. The flange should have an unrelieved, flat face against the wheel. If the flange is relieved as shown in Fig. 11 there is a tendency for the flange to pull the bushing out of the wheel as the wheel tends to tighten in operation.

Both shapes of cup wheels can be had with 7/8-in. plain holes. They are mounted by means of an adaptor flange, which has a 7/8-in. pilot to fit the hole in the wheel, a 5/8-in. threaded hole to screw on the machine spindle and a flange to match the one attached to the machine.

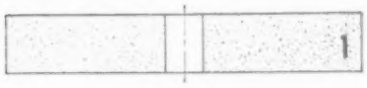
It is to be noted especially that there is an important difference in the flanges used on the machines. With bushed and threaded wheels the flange should be unrelieved; with plain holes the flanges are relieved. If the back flange of a plain hole machine is not relieved to match the inside flange, there will be uneven bearing which will set up stresses apt to break the wheel. That is something worth guarding against.

All cone and plug wheels are made with blind, threaded holes as shown in Fig. 14. The mounting shown in Fig. 14 is correct. The flange is unrelieved, and the machine spindle is shorter than the hole in the wheel but not too short. The flange should be flat and heavy enough so that it won't spring and concentrate pressure close to the hole.

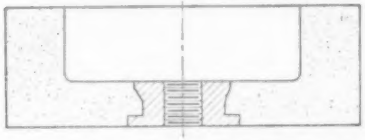
The most common cause of cone and plug wheel breakage is caused by the threaded part of the spindle being so long that it can touch the bottom of the hole. As the wheel tends to screw on the spindle when under a grinding load, the spindle presses hard against the wheel and breaks off the bottom. See Fig. 15.

The best way to rectify this condition is to cut off enough of the spindle so that the end cannot touch bottom. Another way is to use an accurately made spacer between wheel and flange, to reduce the effective length of the spindle thread. In doing this, be sure that the spacer is not too thick. If it is, the effective length of the spindle thread will be too short—Figs. 16 and 17. The load will be concentrated on too few threads, the end of the bushing will pull out, and the wheel will fly off.

TYPE 1—STRAIGHT WHEELS
4, 5, 6 and 8 in. diam
Mounted Between Flanges

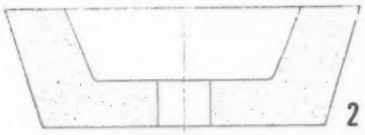


TYPES 6, 11—CUP WHEELS*
4, 5, and 6 in. diam
Screw Mounted (Threaded Hole)



Type 6

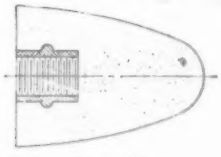
Plain Hole with Adaptors



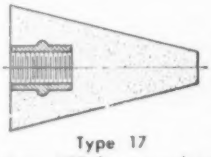
Type 11

*Either style hole available for both type wheels

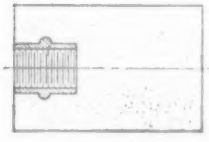
TYPES 16, 17, 18 and 19—CONES AND PLUGS
1 to 3 in. diam.
Screw Mounted (Threaded Hole)



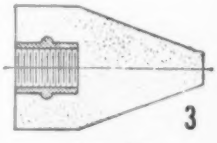
Type 16



Type 17
(Type 17R has round tip)



Type 18
(Type 18R has round end)

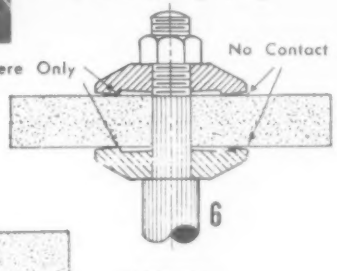


Type 19
(Type 19R has round tip)

"Sprung" Flanges Caused by Excessive Tightening

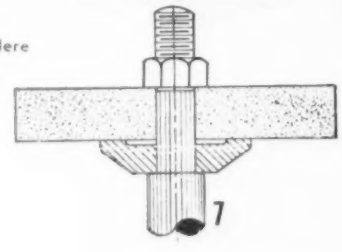
Contact Here Only

No Contact Here



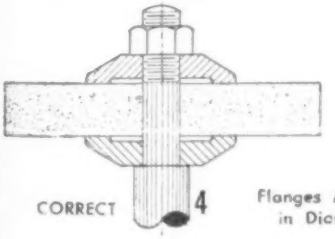
INCORRECT

Outer Flange Omitted



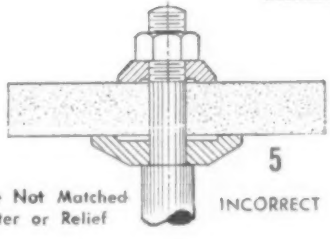
INCORRECT

Flanges Are Equal in Outside Diameter and Relieved to Produce Equal and Opposite Bearing Areas



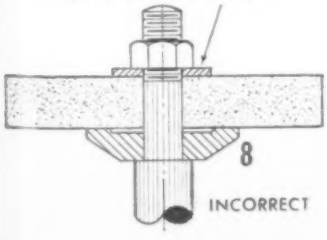
CORRECT

Flanges Are Not Matched in Diameter or Relief



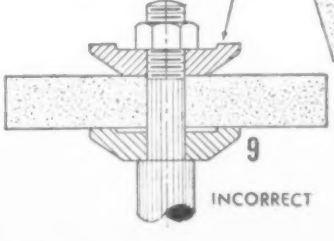
INCORRECT

Unsatisfactory Substitute for Properly Relieved Flange



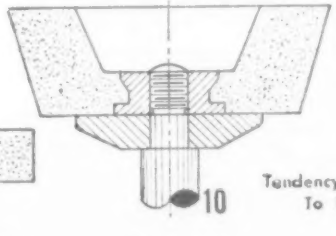
INCORRECT

Outer Flange Reversed



INCORRECT

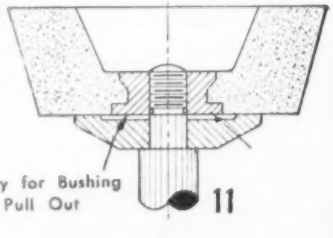
Flat Flange—No Relief Provides Proper Support for Steel Bushing and Wheel



CORRECT

Relieved Flange Does Not Provide Proper Support

Tendency for Bushing To Pull Out



INCORRECT

It is dangerous to mount a cone or plug wheel on a machine designed to use straight wheels, for those machines do not have spindles that are threaded all the way to the flange. Since there is no bearing against a flange, all of the load is carried by the threads. The wheel may work loose and the unthreaded part of the spindle tends to be forced into the wheel and cause a bursting stress.

The best cure for this trouble is to cover the unthreaded part of the spindle with a spacer. Spacers, incidentally, should be accurate as to thickness, flat and reasonably smooth. A rough makeshift such as a washer will set up new stresses of its own.

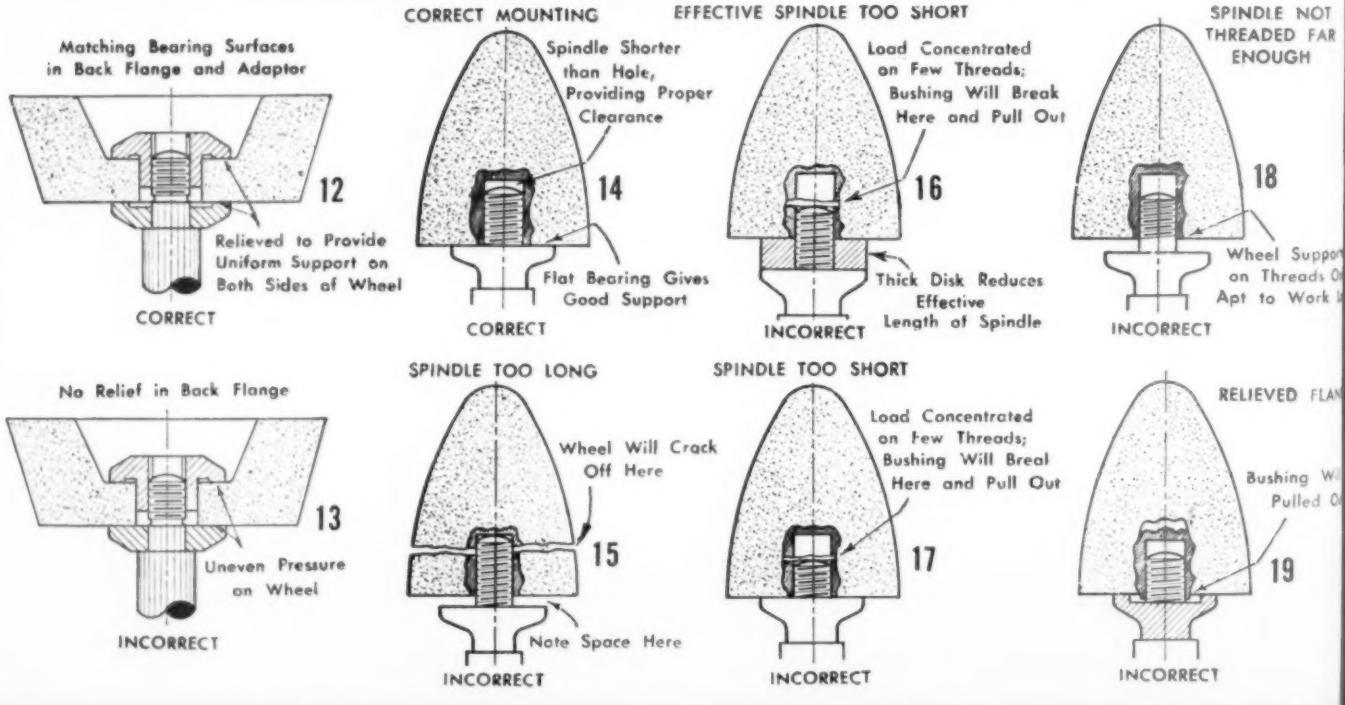
Fig. 19 shows what happens if the flange used with a cone or plug wheel is recessed. In operation as the wheel tightens, the bushing may readily be pulled out of the wheel, and the wheel fly off.

Be sure a wheel is mounted on the type of machine it is intended for—so far as speed is concerned. Many shops use two kinds of machines—low speed which are used for wheels of vitrified bond that operate at not more than 6500 surface fpm, and high speed for resinoid bond up to 9500 fpm.

It is to be remembered that the centrifugal force, which is the ultimate cause of wheel breakage, increases not directly with the speed but as the square of the speed. Thus operating a vitrified wheel at resinoid wheel speed increases the speed about 46 per cent, but increases the centrifugal force 113 per cent. That is a heavy overload.

All wheels are marked with the safe operating speeds in revolutions per minute. Machines, too, should be marked to show their speeds in rpm. Before mounting a wheel on a machine, the two should be compared.

It is unsafe to try to convert a low-speed machine into a high-speed one. It should not be done without



consulting the machine maker. The machines may not be rigid enough, the bearings not adequate, and protective guards may not be strong enough for high speeds.

A systematic plan for frequently checking the speed of machines is advisable. Often it will be found that speeds are too high even for high-speed, resinoid wheels. The speed governor of air-driven tools may get out of adjustment. In a mistaken idea that they are improving production, operators often disconnect the governors.

Check the air pressure. Not the pressure as shown by the indicator at the compressor, but the actual pressure at the tool. It may be much lower due to line loss. For methods of checking air pressure see "Cutting Cost of Portable Tool Operation," THE FOUNDRY, December, 1947. In the same way the voltage of high cycle electric tools should be checked frequently.

Inadequate power will cause the wheel to slow down when applied to work with normal pressure. Flat spots develop, and the resulting bumping action of the wheel may cause the wheel to break. There is only one cure—get a higher powered machine. Over-speeding won't do it. The machine can't be made to do more than its rated job, and the over-speeding is dangerous.

Here are some of the common ways in which wheels are abused—due to poor operation practices in the cleaning room.

Straight Type 1 wheels are designed to grind on the periphery, not the side. For grinding with a flat action, use Type 6 or Type 11 cup wheels. They are designed for it. Many straight wheels break when a heavy or sudden pressure are brought against their sides. Such side pressure can also be brought on straight wheels if, in cleaning out grooves or between projections, they are "cramped".

To reduce wheel wear there is often a tendency to order wheels that are too hard for the job. A too-hard wheel does not remove material as freely as one of softer grade. To improve a wheel's cutting action, operators sometimes "dress" it by striking it against the work. Breakage often ensues. Get softer wheels.

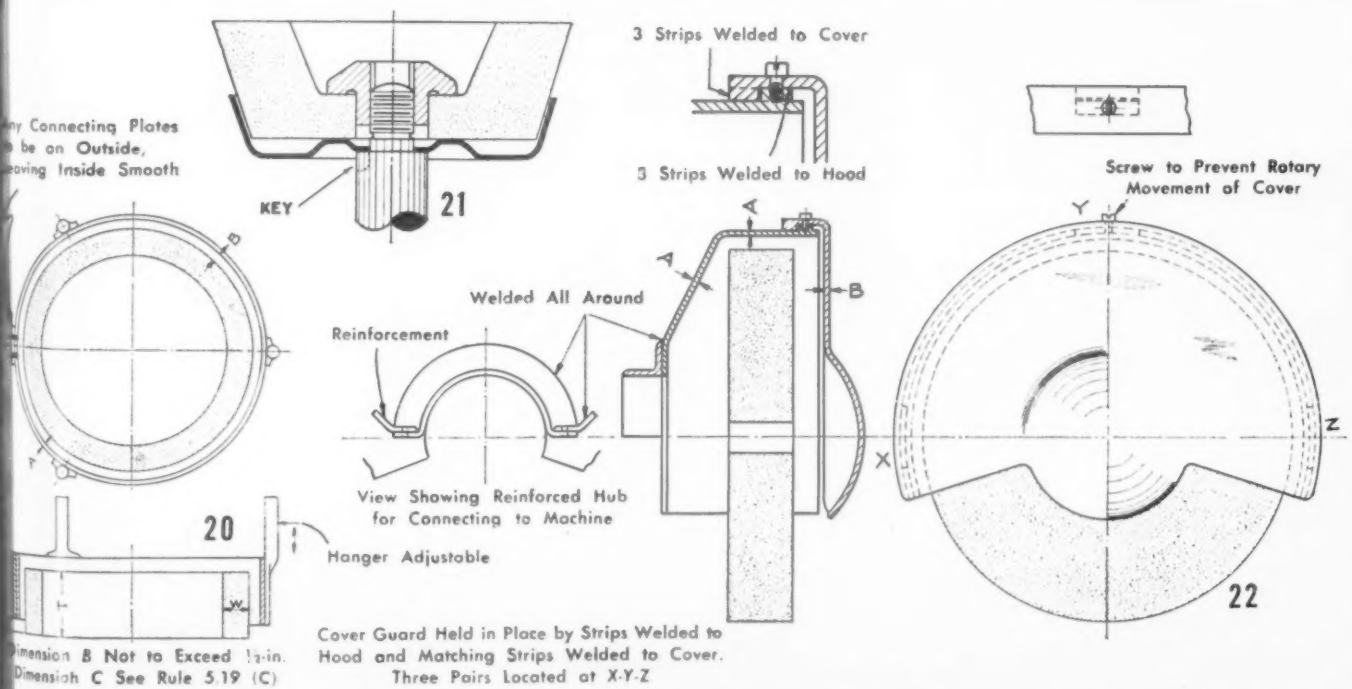
Many wheels break because they have been damaged in handling. Contrary to what is the usual belief, there is no such thing as an unbreakable grinding wheel. They are strong enough for proper usage, but are not designed to withstand rough handling.

Yet portable machines get more rough handling than any other type of grinding equipment. A wheel can be cracked so that it will break in use, by dropping the machine, setting it down carelessly on a bench or the floor or by bumping it against castings or obstructions.

Racks or hooks should be provided for holding portable machines when not in use. One company cut down wheel breakage merely by supplying each bench with a simple V-shaped board holder under each bench which held the portable machine out of the way. It was easier to use it than not—so the operators kept their machines safe.

The American Standards Association Safety Code does not require protection hoods for cones and plugs which have a blind threaded hole, and which are operating at normal speed for cleaning holes and corners.

Straight wheels, Type 1, of 8 in. diameter and less can be guarded by a drawn steel hood of the construction shown in Fig. 22. A satisfactory material in constructing this guard for wheel speeds up to 10,000 fpm is hot rolled (*Please turn to page* 166)


KEY
21
3 Strips Welded to Cover
3 Strips Welded to Hood
Screw to Prevent Rotary Movement of Cover
Welded All Around
Reinforcement
View Showing Reinforced Hub for Connecting to Machine
20
Hanger Adjustable
22
Cover Guard Held in Place by Strips Welded to Hood and Matching Strips Welded to Cover. Three Pairs Located at X-Y-Z

Aluminum Alloy

Recommended practices in cleaning and finishing aluminum alloy castings are discussed in this tenth of a series of articles based on a survey sponsored by the Foundry Division of the Aluminum Association

ONE of the chief advantages of aluminum alloy castings derives from the ease with which they may be trimmed and machined. As discussed in the first article of this series, the low cost of these operations as compared with certain other metals, offsets to some extent the higher cost of the metal itself. These operations also are facilitated by the light weight of the metal which makes the castings easy to handle. Smoothness of the metal surface, absence of burned-in sand, and the nonabrasive character of the metal are other advantages in the finishing operations.

Perhaps no other commonly used metal offers as broad a range of surface finishes as aluminum. For many purposes, of course, no special surface treatment is needed, as the metal has an attractive appearance which suffers little change under a wide variety of service conditions. Where the plain aluminum surface does not provide the desired qualities a large number of easily applied finishes is available, ranging from the purely utilitarian to the highly decorative. They are applied by either mechanical, chemical, or electrochemical means, depending on the required surface characteristics and the desired appearance.

Trimming — The usual finishing operations, such as core knockout, chipping, sawing, grinding, and polishing, are performed with standard tools developed for these purposes. However, modifications in tool operation are desirable in the production handling of aluminum castings, as compared with similar operations on other metals.

Removal of the cores is usually the first operation. Ordinarily a light rapping of the casting and occasionally probing with a bar are sufficient to loosen the cores so they can readily be removed. Care must be exercised not to damage or warp the castings by rough handling, especially when hot. Pneumatic rapping devices often are used for this purpose as well as more recently developed shakeout machines. Where cores are especially inaccessible, they may be broken down by baking, or removed by a water-sand blast.

Sprues, gates and risers that are readily accessible

1

2

Castings

By FLOYD A. LEWIS
Technical Consultant
Aluminum Association

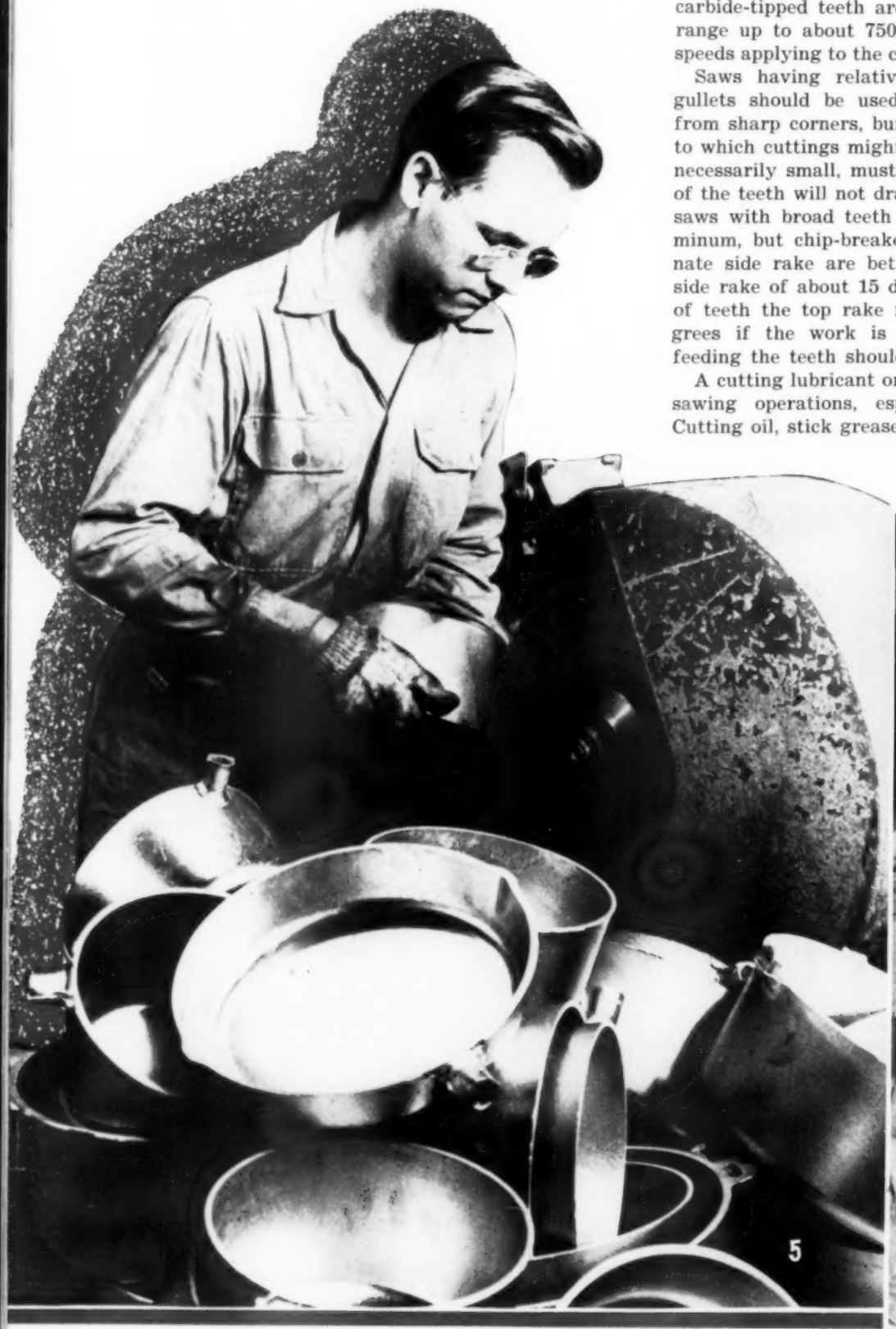
Fig. 1—Interior of sand blast room showing turntable
Fig. 2—Hand finishing small aluminum castings
Fig. 3—Grinding cast aluminum flanges for door hinges
Fig. 4—Sawing risers from aluminum ring casting

can easily be removed with band saws. Heavy-duty woodworking saws are satisfactory for average work, but for heavy work high-speed metalworking saws are preferred. Saw-speeds range from about 3000 to 5000 feet per minute, depending on the metal section. The use of holding fixtures and automatic saw feeds are feasible with large production runs and will promote more uniform cutting and longer blade life. Band saw teeth should have a 5-degree top rake and about 0.015-in. clearance on each side to minimize heating. Wood saws with a negative rake should not be used.

Circular saws and hack saws also are used to a considerable extent in trimming operations, giving a closer and staighter cut in some instances. Saws of semi-high-speed steel or high-speed steel generally are used, but in some cases saws with cemented-carbide-tipped teeth are employed. Peripheral speeds range up to about 7500 feet per minute, the higher speeds applying to the carbide-tipped saws.

Saws having relatively coarse teeth with round gullets should be used; the gullets should be free from sharp corners, burred edges and rough surfaces to which cuttings might adhere. Clearance, although necessarily small, must be provided so that the sides of the teeth will not drag and generate heat. Circular saws with broad teeth are used extensively for aluminum, but chip-breaker teeth and teeth with alternate side rake are better; the latter should have a side rake of about 15 degrees. With these two types of teeth the top rake may vary up to about 45 degrees if the work is fed mechanically. For hand feeding the teeth should have little, if any, top rake.

A cutting lubricant or coolant is necessary for most sawing operations, especially for heavy sections. Cutting oil, stick grease or tallow may be used, being



fed to the sides of the saw blades. For the higher saw speeds, it is important that the sawing machines and fixtures be free of vibration to minimize fatigue failure of the blade or teeth.

Pneumatic chipping hammers are useful for removing gates and risers that are not accessible for removal by other means. They are also used in removing fins and other irregularities as well as metal left after sawing or shearing off sprues, risers and gates. Substituting a blunt tool for the chisel gives an excellent device for peening other surface irregularities.

Rough Grinding and Polishing — Numerous types of grinding wheels are available for snagging and rough-grinding operations. For grinding external surfaces of small castings bonded abrasive wheels mounted on conventional lathes are satisfactory. Less accessible surfaces are readily reached by flexible-shaft machines with small burrs. For rough grinding large aluminum castings, portable tools driven by compressed air or electricity at surface speeds of from 5000 to 7000 feet per minute commonly are used.

Rotary vertical grinders with bonded abrasive wheels are useful where a large amount of metal is to be removed from a flat surface; for irregular surfaces flexible abrasive paper disks may be used on grinders of this type. Lubricants such as stick tallow or grease are satisfactory for these operations, but care must be exercised to avoid driving too much lubricant into the pores of the metal, as this might cause surface spotting during subsequent finishing operations.

Aluminous abrasives ranging from No. 14 to 36 are generally preferred for rough grinding work. Solid wheels with synthetic resin bond are most commonly used, but vitrified bonds are better for some applications. Peripheral wheel speeds up to 10,000 feet per minute are permissible.

Rough grinding usually is followed by rough polishing, which is best done by canvas or muslin wheels built up to the required thickness. Abrasive is either glued or cemented to the circumferential surface. Softer abrasives must be used for aluminum castings than for many other metals, and peripheral wheel speeds of 5000 to 7000 feet per minute are adequate.

Files are used for final rough finishing of castings and for cleaning up inaccessible sections that cannot be reached by conventional grinding wheels. Portable electrically driven rotary files are finding increasing use for this purpose. Sizes range from ¼ to 1½ in. in diameter and speeds range from 3,500 to 10,000 rpm.

Welding—As is common practice with iron and steel castings, many foundry defects in aluminum castings may be repaired by welding. Likewise, welding is useful in repairing broken castings and in joining castings to wrought sections. Either the gas-torch or electric-arc method may be used. Oxy-acetylene and oxyhydrogen flames are both satisfactory, the former usually being preferred for general work and the latter for thin sections. Both metallic and carbon arcs are used, the former being faster and more flexible and the latter producing welds freer of oxides and porosity.

Areas to be welded must be thoroughly cleaned of all foreign, matter, and defects must be cleared of all unsound metal and dross. Large or intricate castings must first be preheated to avoid thermal stresses and to facilitate development of the temperature required for welding. A temperature of 800° F usually is adequate. After welding, the casting should be cooled slowly to reduce the danger of excessive stresses and possible cracks.

For welding castings not requiring heat treatment, welding rods of alloy S1 or SC1 (see article II, January 1948, for composition) generally are used, but for heat-treated castings rods of the same alloy as the castings are better. Castings requiring heat treatment should be welded before treatment, or retreated after welding. Small defects in areas of low stress, however, can usually be welded in castings that have already received heat treatment without seriously impairing strength, especially if the arc method is used.

To insure solid welds free from oxide inclusions, a flux should be used. (*Please turn to page* 212)

Fig. 5—Smoothing surfaces of cast utensils on a stand grinder. Fig. 6—Chipping rough spots on a large aluminum casting

Precision Invt

At International Ni

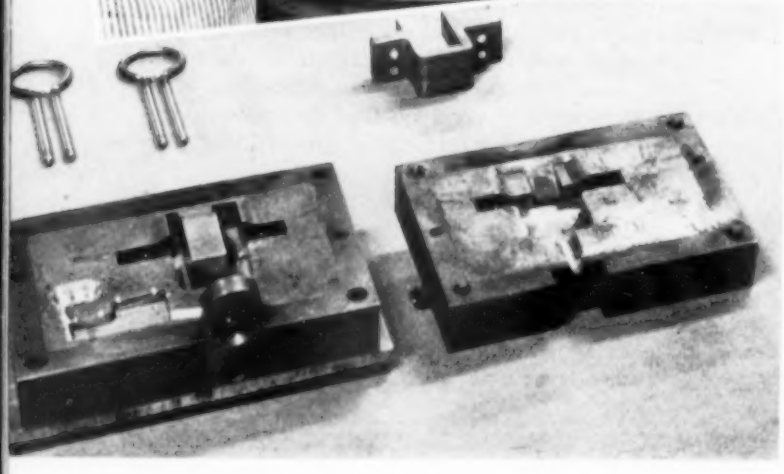
CENTURIES old, yet war-born into industrial prominence, precision casting by the lost wax method has received increasing attention as a molding process for producing complicated shapes requiring a minimum of machining time. A wide range of alloys may be cast. Many of the materials used cannot be machined, and others can be machine-finished only with the greatest of difficulty.

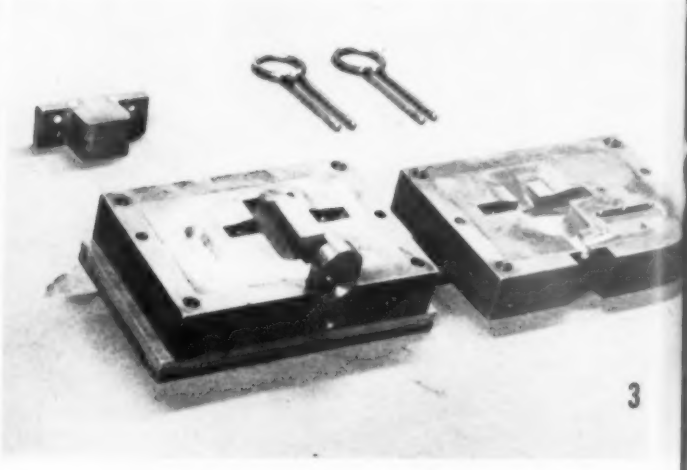
Fundamentally the process consists of transferring, by several steps, the shape of a master pattern to a master mold made of a low-melting-point alloy, usually bismuth and tin. Using this mold, the original shape is reproduced as a wax pattern which is used to form still another mold in a material which resembles both plaster and concrete. Then the wax pattern is melted out to form a cavity for the metal. It is from the melting out of the wax that the process derives its name. Actually, all the wax is not

Fig. 1—Master pattern is embedded in plaster of paris in one half of a two-section flask

Fig. 2—Low-melting-point alloy is forced into the clamped flask under pressure

Fig. 3—Completed master molds are shown at left and right. Prongs in background are cores for rivet holes used to eliminate need for drilling





VTMENT CASTING

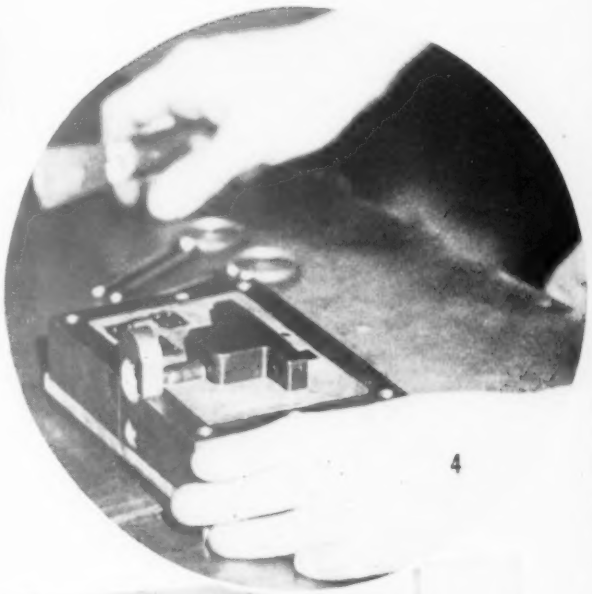
al Nickel Co.

By ROBERT H. HERRMANN
Assistant Editor
THE FOUNDRY

lost, about 70 per cent being salvaged and reused.

Industry is turning to another and more accurately descriptive name—precision investment casting—for the industrial application of the lost wax method. Depending upon size and design, castings can be made with tolerances of plus or minus 0.005-in. per inch of the overall length of the castings. In some cases it is possible to reduce these tolerances; in other cases they must be increased.

Angular tolerances are of the order of ¼-degree. Cored holes can be made to advantage if the diameter of the hole is not less than one-half the section thickness. The diameter of blind holes should not be more than 1¼ times the depth. Outside corners on precision castings may be sharp but inside corners, particularly where there is a transition from a light to a heavy section, should be filleted with the maximum possible radius.



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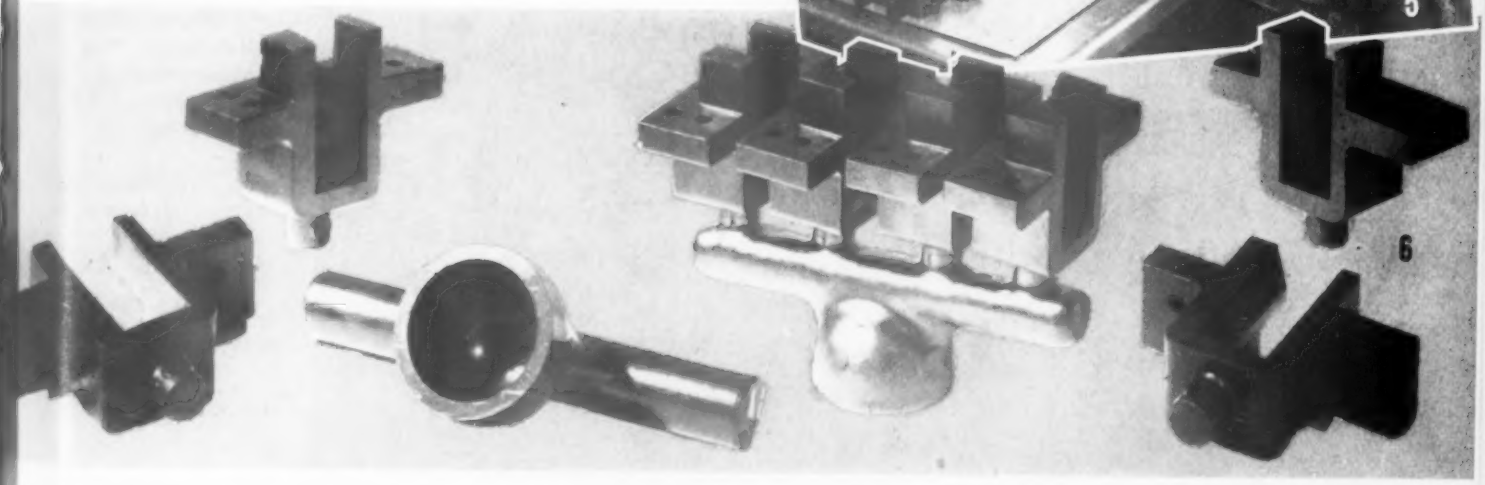

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Fig. 4—Wax pattern ready for removal from mold

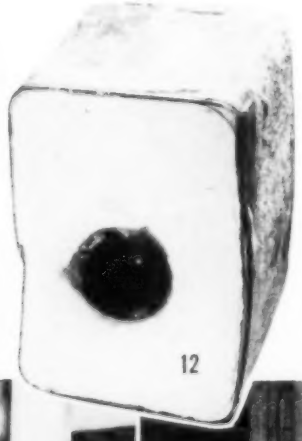
Fig. 5—The two half sections of the master mold with prongs in place are clamped together in the injection machine where molten wax is injected into the mold to form the wax pattern

Fig. 6—Sprues and wax patterns before and after mounting

Fig. 7—Sprue and pattern assemblies being dip-coated

Fig. 8—Dip-coated assemblies are dusted with sand while still wet

Fig. 9—Paper-lined metal flask is placed over the assembly



Sections as thin as 0.015-in. are possible where they are continuations of tapered sections and do not exceed ¼-in. in length. Areas up to approximately 12 sq in. may be cast in sections as thin as 0.04 in. These may be held quite flat but reinforcing ribs to prevent warping should be included where possible.

It is impractical to cast internal threads because of conditions involving the investment material. External threads smaller than ¼-in. diam x 20 threads per inch, should be cut with a die and all cast threads must be chased.

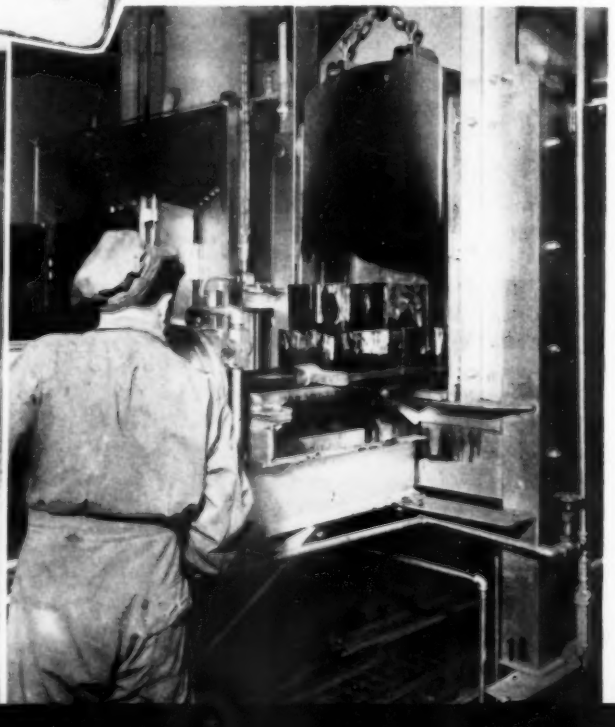


Fig. 12 — Top view (left) and bottom view (right) of flask after surplus hardened investment material has been sawed off

Fig. 13 — Molds are heated in oven to melt out wax

Fig. 14 — Molds are preheated in another oven prior to pouring

PRECISION INVESTMENT CASTING

Fig. 10—Investment slurry from the mixer at right is poured into flask

Fig. 11—Loaded flasks are placed on jolting tables to jolt-pack the investment material firmly around the wax assemblies

The subject of tolerances, however, cannot be discussed generally. Since two or more castings rarely, if ever, pose the same specific problems, it is necessary for the plant to base its tolerance estimates on each master pattern submitted. Generally, throughout the precision casting industry there is growing acceptance of the fact that there is a practical limit to the tolerances that can be achieved in commercial production.

One of the more recent precision investment foundries put into production is at the Bayonne Works of International Nickel Co. Inc., Bayonne, N. J. Housed in a modern building affording the maximum of light through "walls of glass" and "daylight" fluorescent lights, this plant is designed especially for the manufacture of precision castings.

One's impression of the entire foundry is that it was plucked right out of the pages of a book describing "ideal" foundries. Walls and ceilings are painted apple green, with metal window frames, supporting pillars and fixtures such as radiators in a slightly darker shade of green.

All equipment requiring special, eye-catching attention is painted a bright yellow. This equipment includes trucks, tote boxes, electric switch boxes and exit doors. Work areas and aisles are designated by broad white lines. Ample space is allowed for each and the resultant freedom from confusion creates an atmosphere of smooth, efficient flow of materials in production.

That well-groomed look is extended still further in the large bench and table area wherever bench work is done. Convenient tote boxes are placed within reach of workers engaged in cut-off and grinding operations and in inspection. Chair-type stools are provided for all workers engaged in bench work. Castings are brought to them in boxes, and when the castings are processed they are dropped into other boxes which are carted away. It is unnecessary for these workers to leave their chairs in the performance of their activities.

The absence of dirt, dust and clutter is noticeable. Every effort has been made to eliminate these nuisances. Orderly arrangement and good housekeeping take care of the clutter. Dirt and dust generated in the various operations are removed through exhaust outlets located at the shakeout and at each grinding station.

Because of the adverse effects of incorrect temperature and humidity on wax patterns, proper air conditioning is a necessity. At the Bayonne Works the entire operation involving the handling of wax patterns is segregated in a large room where temperature and humidity are kept constant the year 'round, and dust and other atmospheric impurities are effectively eliminated. These operations include the casting of the wax patterns, assembling them into units with sprues and risers, and the coating operation where they are prepared to have the investment poured around them.

The key to a good precision investment casting is the master pattern, which usually is supplied by

Precision Investment Casting

the customer for whom the casting is intended. It is generally made of chromium-plated steel or of brass, polished to provide an exceptionally smooth surface free of all defects, and is made approximately 1½ per cent oversize to allow for shrinkage.

When a master pattern is put into production at Bayonne, it is first checked for accuracy against the blueprint of the finished casting. It is then partially embedded in plaster of paris in one half of a two-section flask as shown in Fig. 1. A thin rubber membrane is then stretched over the master pattern and fastened around the sides of the flask. This half section of the flask is clamped to the other half section which is empty and the assembly is placed in the machine illustrated in Fig. 2. Since the plaster is relatively porous, it is possible to exhaust the air from the under side of the membrane through the plaster. This causes the rubber sheet to depress over the pattern and conform to the desired contour.

A low-melting-point alloy is next poured into the clamped flask under pressure up to 100 psi, filling the empty half-section of the flask and forming half of the master mold. The flask sections are removed from the machine and separated. The master pattern is inserted in the cavity formed in the completed section and a rubber membrane again stretched over the mold and clamped around the edges. This time it is necessary to drill a small hole in the die metal at the base of the mold cavity to allow air to be exhausted from behind the membrane.

This hole later is patched with the same alloy before the mold is placed in production. The other half-section of the flask from which the plaster of paris has been removed is clamped on top and die metal is again introduced. The thin rubber sheet is unaffected by the low melting point alloy and serves in both instances to provide a smooth surface to the mold cavity and prevent fusion of the molten alloy with the master pattern and with the plaster or solidified metal in the other flask section. The two sections of the mold thus formed, illustrated in Fig. 3, after being suitably gated and cleaned up are ready for use in the wax injection machines.

A wax replica of the master pattern is made in a wax injection machine under pressure which varies with different types of waxes and the degree of pattern intricacy. The master mold is coated with a liquid lubricant which is (*Please turn to page* 188)

Fig. 15—Metal for pressure pouring is melted in electric arc furnaces

Fig. 16—Metal for statically poured castings is melted in an induction furnace

Fig. 17—Furnace is inverted to pour casting by pressure

Fig. 18—Fine grinding and polishing castings. Dust is removed through exhaust duct in middle of table

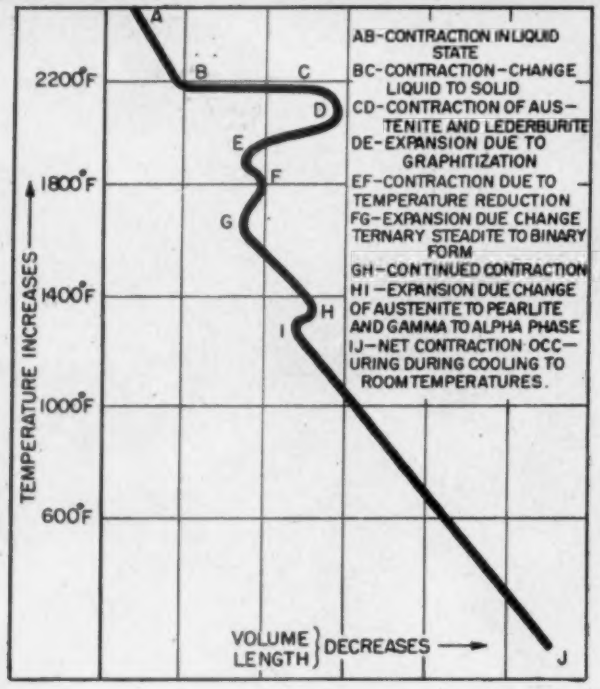
Fig. 19—Visual casting inspection

Fig. 20—Casting is knocked out of flask by pneumatic hammer

Fig. 21 — Metal from induction furnace is poured by ladle into the mold

Designing Castings in Gray Iron

By CHARLES O. BURGESS
Technical Director
Gray Iron Founders' Society
Cleveland



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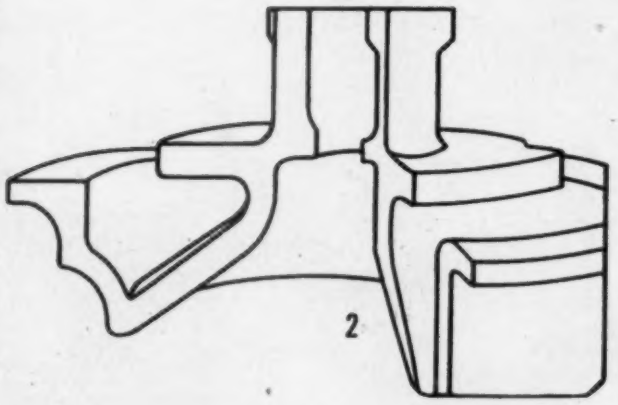

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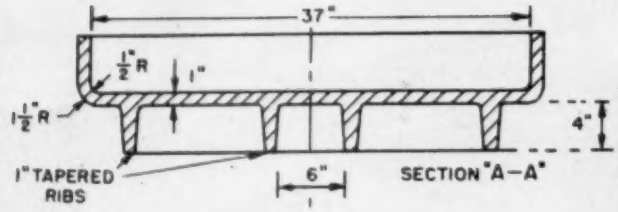

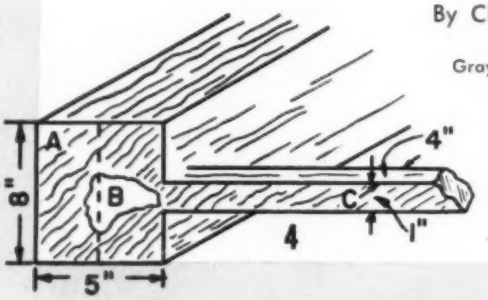

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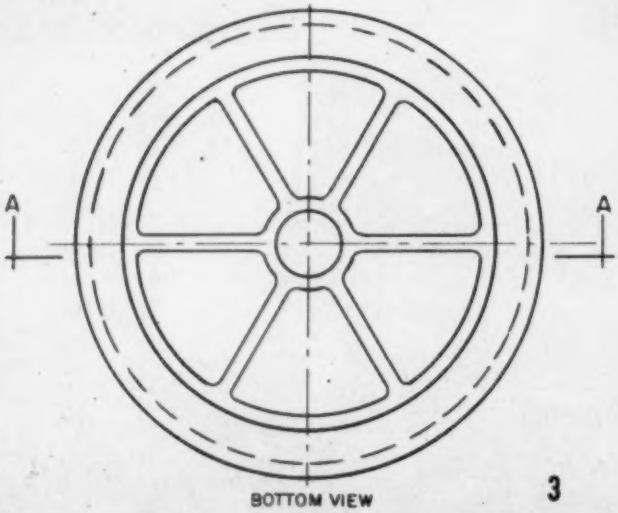

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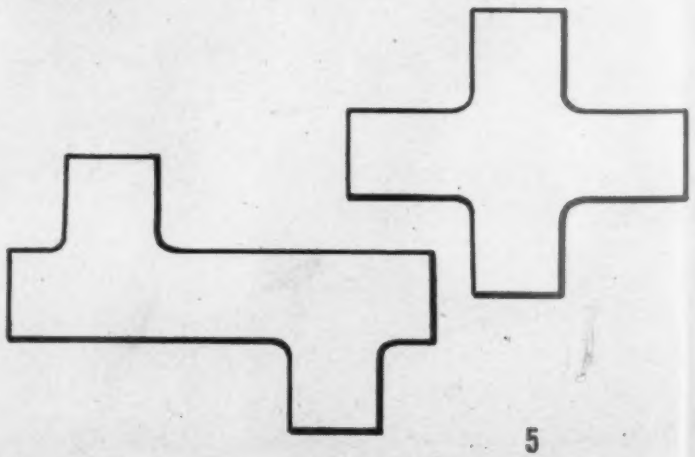

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GRAY cast iron, because of its unusual founding properties, is uniquely adapted to the ready production of an almost endless variety of dependable and industrially useful castings. Consideration of a single example, such as an automotive block, is sufficient to demonstrate this fact. Among the founding properties of gray iron that facilitate its use in production of a complicated structure as a single unit are (1) its comparatively low melting point, (2) its high fluidity and ability to faithfully reproduce a given pattern, and (3) its comparatively low shrinkage or contraction which results in greater soundness and decreased internal stresses as compared with other materials.

Despite the high degree of freedom, as concerns both original design or subsequent design changes, made possible by specifying gray iron, it is a grave mistake for the engineer to ignore the problems of the foundryman. This is not a new story and in recent years some real progress has been made in mutual co-operation between designer and foundryman. In many cases, however, the unfortunate situation still exists where a particular part is specified for casting that unwittingly presents a maximum number of difficulties from a founding viewpoint.

Avoidance of such difficulties is complicated when the design has reached an advanced stage. Obviously, it is unfair for the foundryman to expect the designer to radically alter a given cast part that has been painstakingly integrated into a complex mechanism. When the design has developed to this degree it is not only a delicate business for the founder to suggest alterations in the finished composition of the designer, but on very practical grounds the desired alteration may necessitate a complete redesigning job. Much too often the foundryman is forced to resort to costly expedients to make an awkward casting approximate, as closely as possible, the lower price, improved soundness and higher functional efficiency that would have been possible originally with a minor change in casting design.

Clearly the ideal time for a consultation between the designing engineer and the foundryman or foundry engineer is when the drawing is still on the drafting board or, at latest, still in the blueprint stage. Even at this stage, considerable open-mindedness must exist on the side of both parties, as most frequently a compromise is indicated between simplicity and efficiency of the finished part on the one hand and optimum founding characteristics on the other. It is surprising, however, how often a comparatively simple alteration in shape of a cast part will simplify its economic production enormously. It is also a somewhat surprising fact that casting characteristics normally improve with the streamlining of a part usually desirable both from appearance and functional viewpoints. Moreover, it is significant that a specialist in the founding field frequently can discover additional locations at which castings can be employed advantageously with substantial savings in machining or fabricating costs.

Although the advisability of the co-operative approach cannot be too strongly urged, it is realized that conditions will continue to arise where such consultation is impractical or impossible. In such cases, it is felt that some of the principles that facilitate casting production should be reviewed briefly for the benefit of the designing engineer. Many of these principles can be violated in case of necessity but it should be realized that such violations invariably entail increased cost to both consumer and foundryman, and in extreme cases may mean a sacrifice in soundness or physical properties of the cast part.

Basically the chief problem of the foundryman arises from the fact that he must cast a liquid material into a form or mold, and subsequently take from this mold a solid, high-quality product that will, within close tolerances, (*Please turn to page* 224)

Fig. 1—Diagrammatical representation of expansion and contraction effects in gray iron

Fig. 2—Cut-away section of a cylinder head casting showing properly proportioned sections

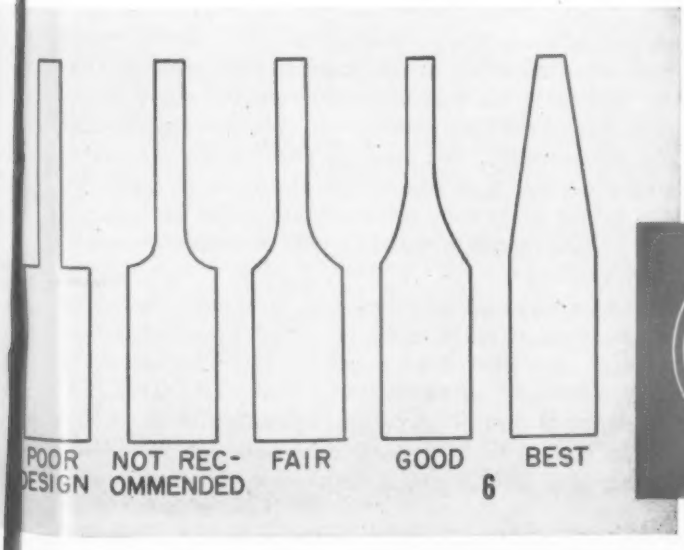


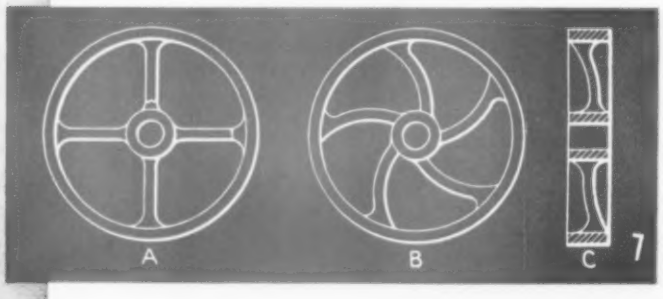
Fig. 3—Method of avoiding a hot spot at intersection of heavy ribs of a drying tray

Fig. 4—Adjoining, unequal metal sections are a common cause of casting defects when heavy sections cannot be supplied with hot metal

Fig. 5—Offsetting of arms of X section, as in design at left, to avoid a hot spot

Fig. 6—Alteration of design to reduce possibilities of hot tear formation

Fig. 7—Faulty design at *A* is corrected by use of five curved spokes as in *B* or the alternative design as in *C*



Questions AND Answers

Flame Harden Face of Iron Casting

Q.—Please send us any available literature on the subject of hardening cast iron.

A.—Presumably you are referring to some process for increasing the hardness of castings already in existence. As a practical foundryman you are familiar with the use of chills, also of arranging the composition of the cupola charge to produce a casting showing a definite hardness. Brief reference to the subject is made in two AFS publications, *Alloy Cast Irons* and *Cast Metals Handbook*.

An exceptionally complete and detailed paper on the subject "Flame Hardening Cast Iron" by R. H. Olmsted, Farrel-Birmingham Co., Inc., Ansonia, Conn., appeared in THE FOUNDRY, May, 1946, commencing on page 152. Theory on which the process is based is comparatively simple, but a considerable amount of special equipment is required, and the iron has to be of a certain definite composition. The process is a fairly modern development in advanced foundry practice and involves on the part of the operator a metallurgical foundation, also scientific control instruments and familiarity with their use. It is claimed that surface hardness is increased by heating the castings to 1500 F, and then cooling them quickly. Naturally the details vary to some extent depending on the thickness, composition, shape and size of the casting.

Metal Is Not Quiescent in Mold

Q.—We are sending for your examination a casting with which we have had considerable trouble for several months. You will note the numerous holes which show up after machining. We are using 1000-lb charges in the cupola with by-product coke. Iron charge contains 200 lb pig iron, 600 lb scrap iron, 200 lb mild steel plate scrap, 7 briquets containing 1 lb Si, 3 briquets containing ½-lb Si and 1 lb Mn, and 6 lb pure carbon briquets. Casting shows 2.29 per cent Si, 0.78 per cent Mn, and 3.16 per cent TC. Casting is made on squeezer from an aluminum matchplate of six castings using a naturally bonded molding sand. Casting is all made in drag with runner in the cope, and gated on the side of the cup using a pouring basin with two risers. Sand contains 7.6 to 10 per cent moisture and a permeability of 52 to 57. We realize that moisture is high, but is necessary to work sand to best advantage, and we do not have this defect with other castings poured under the same condition.

A.—In our opinion the numerous holes in the casting are caused by the high moisture content of the sand, but possibly some might be due to use of a damp or wet ladle resulting in the molten metal picking up hydrogen. Examination of a number of the holes or cavities under a low power magnifying glass shows the presence of burned molding sand adhering to the sides, and the only way those could be so located would be from a disturbance of the mold face just before the skin of the metal formed.

Possibly the reason you have trouble with this particular casting is due to the spacing of the castings in the mold, and their conformation. You mention that the castings are made all in the drag which means that the drag must be at least 8 in. deep, and a good part of the gases developed must pass through that much sand to escape. The castings also may be somewhat close to each other, which aggravates the condition. A tight fitting bottom board will not help either.

Experimentally you could try placing good size vents close to the casting cavities, or better yet block off the two center castings' cavities at the gates so they will not be filled, and see whether that corrects the condition. Also see that perfectly dry ladles are used at all times for pouring. This also applies to the mixing and transfer ladles.

Moisture Seems To Be on Low Side

Q.—We are engaged in producing small plumbing goods castings in red brass, and have been using No. 1 Albany sand of the following characteristics: Permeability 20.7; moisture 5 per cent; clay content 9 per cent; green compression strength 3½ psi; grain fineness 325, and fines 25 per cent through 270-mesh screen. In order to bring up our green bond we added approximately 2 per cent southern bentonite all at one time with mulling. What moisture should we maintain after this addition, and should additional bentonite be added from time to time and how much?

A.—It appears to us that some error has crept into the various sand properties you give since a sand with a grain fineness number of 325 hardly would have a permeability of 20, and we would expect that the pan material (through 270 screen) would be at least double the figure indicated. We also believe that you are working your sand on the low side as far as moisture content is concerned, and that you will obtain better properties by increasing to at least 6 per cent. Fine sands require more moisture to make them workable.

Best method of determining the most desirable moisture range is to make up small sand batches of varying moisture content and observe the effect on workability and on the castings produced. Then you can select a desired moisture content with minimum and maximum limitations. Presumably you have sand testing equipment, and it should be an easy matter for you to experiment with small sand batches to find out which particular combination of properties

will give you the best results. Once those are established you can maintain them by making additions of binder, coarse or fine sand, etc., as indicated by the results obtained on the sand tests.

Objects to Sand on the Floor

Q.—We have a modern nonferrous foundry which is well laid out and equipped. However, being something of a bug on the subject of good housekeeping there is one feature of the operation that bothers us. Foundry has concrete floors throughout and is equipped with roller conveyors. In order to avoid damage to the floors and avoid splashing of hot metal, a fairly heavy layer of sand is scattered on the floor between the lines. While that accomplishes its purpose, it results in an extremely untidy appearance, and no matter what efforts are made to have a clean and orderly foundry, the result is disappointing.

A.—Many foundries are pouring on concrete floors without any protective sand covering. It is true that concrete tends to spall when struck by hot metal, and some foundries use hard-burned paving brick in pouring areas to avoid that trouble. In general we believe that if there is much metal spilling during pouring that operation is being done rather carelessly. Of course, there may be an occasional runout which cannot be helped, but ordinary care in pouring should place all the metal in the sprue and not part of it on the floor. The pourers should wear the necessary safety clothing such as leggings, goggles, shoes, and aprons to prevent any burns from inadvertent splashes, etc.

It appears to us that one step would be to study your pouring methods and correct those causes of metal spillage, such as not having the crucible or ladle lip over the sprue before pouring is begun, seeing that pouring is cut when sprue and risers are full, and pouring faster than required to keep the sprue full, etc. When that is accomplished the metal spillage will be at a minimum, and the sand covering on the floor should not be necessary.

Cores Cause Trouble in Bushing

Q.—We are making bronze bushings and are having difficulty with large pin-holes. Alloy is 80-10-10 with addition of 1 lb phosphor-copper to 100 lb metal. One of the castings is 8 in. long, with a 4 in. hole and $\frac{3}{4}$ in. wall thickness, weighing about 30 lb. Casting is poured horizontally with runner extending the length of casting with riser on the front end; mold is tipped about 3 in. Pouring temperature is 1900°F. Outside is clean, but pinholes are located in bottom part of casting on the inside. Other casting is 10 in. long, 2-in. wall with 8-in. hole and weighs 170 lb. It is poured standing up with two risers and a choked gate. Holes are prominent on the inside only. Metal is poured at same temperature. Cores are made with core oil and one part cereal binder. Cores are painted with core wash when hot to dry at once.

A.—The fact that the holes in your bushings are confined to the interior of certain types leads us to the opinion that the source of trouble lies in the cores, and we suspect from your description of the procedure employed that the cores are not always dry when placed in the mold. Putting on the core wash while the cores are still hot is good practice, and probably in the majority of your cases sufficient heat is present to drive off the moisture in the wash. However, in the others proper drying does not take place, and a boiling action occurs when hot metal comes in contact with the core. In our opinion it would be safer practice to put the cores back in the oven for a short time after the wash has been applied to make sure that they are perfectly dry before placing in the mold.

Data on Casting of Monel Metal

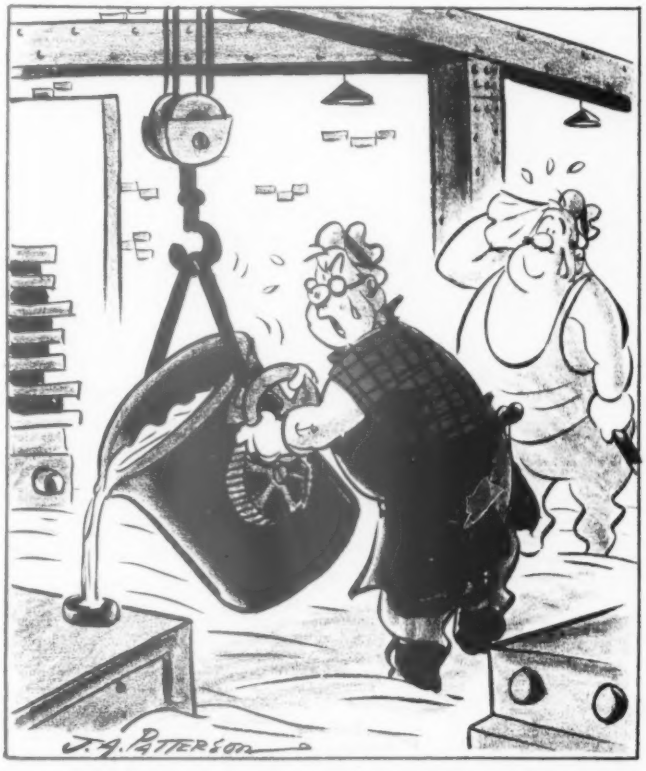
Q.—We shall appreciate information on the proper procedure for melting and casting nickel-copper alloy.

A.—To be of real service, any attempt to describe the melting and casting of nickel-copper alloy presumably you are refering to monel metal—would extend far beyond the limits of an ordinary letter. The metal melts at a high temperature and the sand and molding technique closely resemble those employed in the steel foundry. A suggested mixture contains silica sand 65 to 80 grain fineness number A.F.A., and about 15 per cent high grade fire clay. Moisture content about 5.5 per cent. The mold may be green or dried. Usually the molds and cores are coated with silica wash to produce a smooth skin.

Shrinkage of monel metal is $\frac{1}{4}$-in. per ft, the same as steel. Heavy risers are essential over thick sections. Metal may be melted in oil fired crucible furnaces. Oil should be low in sulphur content, since sulphur has

GANGWAY!

By J. A. PATTERSON



"Then when she said, you don't have to sweat and slave over a hot stove all day—that's when I blew up!"

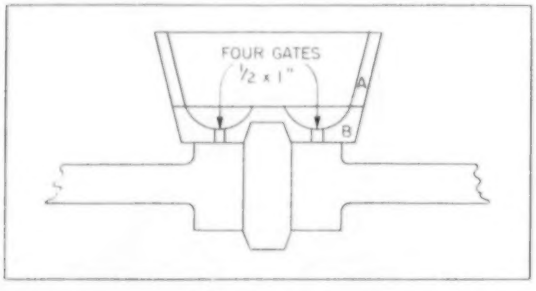
a deleterious effect on monel metal. The metal for casting should contain about 1½ per cent Si. The alloy absorbs gas readily, and should be melted as rapidly as possible. Pouring temperature ranges from 2700 to 2800° F for light section castings. Just before the metal is poured into the mold, it should be degasified with 1½ oz, metallic magnesium per 100 lb metal. The magnesium should be plunged well beneath and held beneath the surface until dissolved. Otherwise the effect will be of little value.

About 3 to 5 minutes before pouring, about 0.5 per cent Mn should be added either as manganese metal or in the form of low carbon, 80 per cent ferromanganese. Then the silicon in the form of 95 or 97 per cent silicon metal is added to bring the silicon up to the desired point. Final deoxidation and degasification are accomplished just before pouring. Glass makes a suitable cover. In recent years the electric furnace is employed extensively for melting monel metal.

Spoke Gear Wheel Shrinks in Hub

Q.—We are forwarding the hub of a 38-lb gear with small shrink holes where the arms join the hub, and with a large shrinkage cavity inside about half way down and next to the 1-in center core. Each cupola charge is made up of 100 lb pig iron and 700 lb scrap. Pig iron analysis shows: Si 8.87 per cent; P 0.85 per cent; S 0.035 per cent; Mn 0.55 per cent. The iron is melted in a 37-in. inside diam, cupola which is not equipped with either pressure or volume meter. We have tried other combinations of pig iron and scrap, but the hub shows shrinkage with or without chills. Would conditions be improved by the addition of fluxing material to produce a greater quantity and a more fluid slag? Can you send us an analysis report on the scrap hub submitted?

A.—Apparently you are supplied with a good grade of scrap and the fractured areas present an entirely satisfactory appearance. In this instance no blame attaches to the iron composition, the molding or core-



Pouring-cup core and feeder is made in two parts designated A and B in the sketch

making practice. The shrinkage cavities are the result of a universal natural law in the casting field. All metals shrink in passing from the liquid to the solid state. Where the section is uniform and the cooling speed is uniform, the casting shrinks all over, but retains it shape.

Where the section is not uniform, one part cools before another part and interrupts the movement of the metal. The lighter parts draw from the heavier parts and as a result when the heavier parts start to solidify, there is no liquid metal reservoir on which to draw. In this particular instance, the arms cool first and draw metal from the heavy hub. Obviously the remedy is to provide an outside reservoir to feed the hub. In ordinary practice fairly satisfactory results are secured by pouring metal through the ¾-in. diam sprue on the hub. A 4-in diam riser connected to the hub through a 1 x 2-in neck will feed the casting. A second and preferable gating method is shown in the accompanying sketch.

Seats in Iron Valve Are Faulty

Q.—We are sending a section broken from a defective 250-lb gray iron valve body. The machined section is a valve seat that must be clean and solid, and 40 out of 45 were rejected because of faulty seats. Seat is molded in the drag using a slab core 1½ in. thick to form the print in the drag to eliminate crush when setting the large core. Hence, the defective section comes between the slab core and center core. While our molding sand seems to lack bond, we can find no indication of sand failures in either molding or cores. Castings are gated with knife gates on both sides of the rectangular opening or through heads which feed the heavy pads. Regardless of the gating system the seat was defective. We use a cupola lined to 36 in. with 800-lb iron charges and 140-lb coke splits. From 15 to 20 lb limestone (3-in. size) and 4 lb of a proprietary flux are used on each coke split. After six charges we slag the cupola from the rear, but we do get considerable slag in the crane ladle on tapping. Iron shows 2.40 per cent Si; 3.89 per cent TC; 0.80 per cent Mn; 0.59 per cent S, and 0.17 per cent P. We are changing our iron mix to incorporate 25 per cent steel rail scrap, but we do not feel that this is the whole answer. Could the defects be from slag which does not rise in the ladle? We use a skim gate which we have used for years, and believe it to be effective.

A.—So far as we can determine from the casting section submitted for examination, we believe that your main difficulty lies in an iron composition which is not suitable for the metal thickness involved. You mention that the iron has a silicon content of 2.40 percent, and it should be lowered to around 2 per cent—which will occur when you introduce the contemplated 25 per cent steel rail scrap. We can see no indications of slag, and do not believe that it is causing any trouble. The iron structure as exhibited in the fracture is coarse and open, and such iron tends to be shrinky in medium sections, especially when cooling is slow—as it will be with this 250-lb casting containing a large central core.

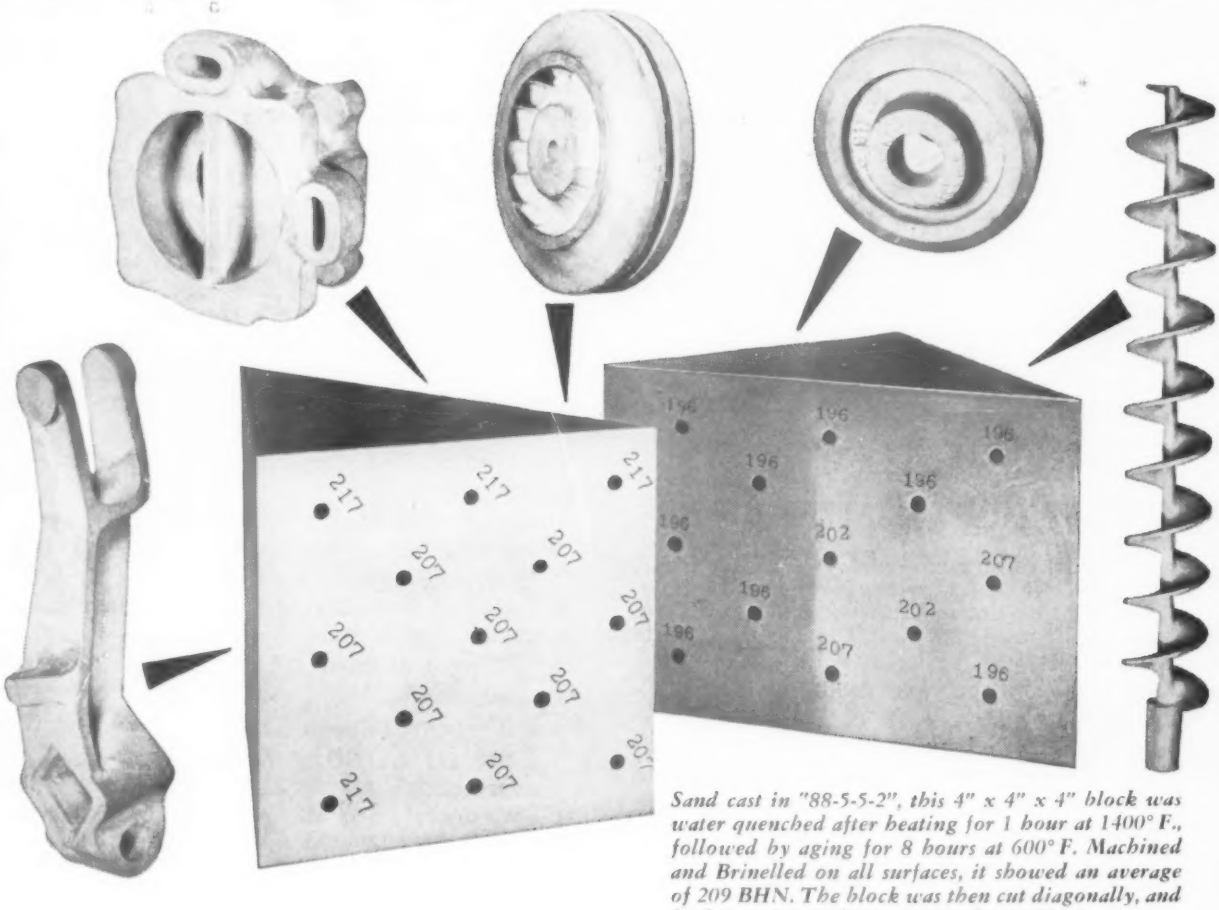
As far as slag appearing when tapping out is concerned, it appears that something is radically wrong with your melting practice, as that should not occur. You do not mention your melting rate, but we suppose that it is 3 to 4 tons per hour. You state that you open the slag hole after six charges have melted, which would give about 150 lb slag. As a guess that should form a layer about 5 to 6 in. thick in the cupola. It may be that you tap out too much iron at one time so that all the iron is drained from the cupola. Probably your slag hole should be raised to provide a deeper well. Again it may be that the iron is not melted hot enough to get a good separation of slag and iron.

(*Concluded on page* 106)

AN AGE-HARDENABLE

NICKEL-BRONZE

DEVELOPED FOR HEAVY DUTY SERVICE



Sand cast in "88-5-5-2", this 4" x 4" x 4" block was water quenched after heating for 1 hour at 1400° F., followed by aging for 8 hours at 600° F. Machined and Brinelled on all surfaces, it showed an average of 209 BHN. The block was then cut diagonally, and both interior surfaces averaged 197 BHN.

Specify "88-5-5-2" (Copper-Tin-Nickel-Zinc) where you want corrosion-resistant bronze castings with extremely high mechanical properties.

This alloy in the "as-cast" condition serves the same purposes as "G" Bronze, but that's not the whole story.

The excellent physical properties of "88-5-5-2" may be immensely improved by heat treating . . . as exemplified by the block shown above.

The Nickel content provides the age-hardening response which increases both tensile and compressive strength, being particularly effective in raising the elastic properties. Nickel also increases fluidity in the casting mixture, thus affording a widened casting range that helps to minimize misruns and improves density and pressure-tightness.

This age-hardening Nickel-bronze meets wide demands. Philadelphia Bronze and Brass Corp., maker of the parts illustrated, produces "88-5-5-2" castings that range in size from ½" x 12" bars to parts weighing over 500 pounds.

EMBLEM OF INCO SERVICE
TRADE MARK

Over the years, International Nickel has accumulated a fund of useful information on the selection, fabrication, treatment and performance of engineering alloy steels, stainless steels, cast irons, brasses, bronzes and other alloys containing Nickel. This information is yours for the asking. Write for "List A" of available publications.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

(*Concluded from page* 104)

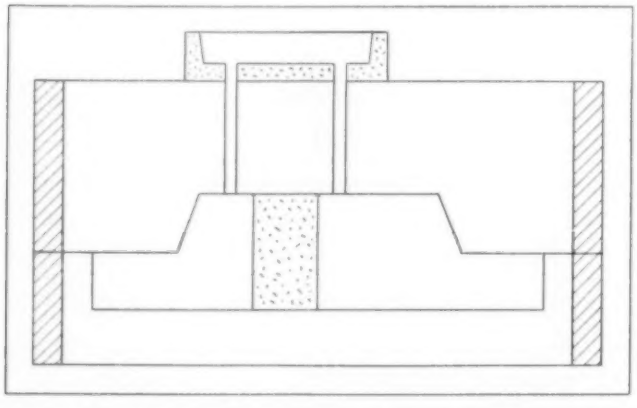
See that the coke bed reaches to the lower edge of the burn-out of the cupola lining and then add from 8 to 12 in. more. That should bring the bed from 40 to 46 in. above the tops of the tuyeres. If the coke bed is ignited by wood fire, allowance will have to be made for the height occupied by that material. Bed should be placed by measuring down from charging door sill after the proper bed height is established. Use an iron rod which is checked for length from time to time. Your limestone is rather large in size for the cupola diameter, and we believe that you will obtain better results with 1-in. size. When you begin to use steel scrap you probably will find that the bed height will have to be increased from your previous practice.

Your iron-to-coke ratio seems to be somewhat low, but that may be due to poor quality coke. However, you might try reducing the amount in the coke splits by trying say 130 lb on the last two or three charges, and note the effect on the iron. If still satisfactory or improved, then the next day try that quantity on the last four or five charges, and so on until the first charge is reached. After several days trial, a further reduction can be tried in the same manner.

Change to Different Type Flask

Q.—We will appreciate your opinion on the best method of gating a cast iron wheel weight 21 in. in diam. At present we are making the mold in a 22 x 38-in. flask, and want to shift the job to a 22-in. diam. snap flask.

A.—Making a 17-in. diam wheel casting in a 22 x 38-in. flask represents quite a waste of sand and time. If the flask were a few inches longer, you could make two castings at a time, and thus double production. In the snap flask set up the casting can be gated through two ¾-in. diam pop gates set diametrically opposite each other on top of the hub. With a deep cope, say from 6 to 8 in. the pouring basin connecting the sprues may be formed in green sand. For a shallower flask it is advisable to use a dry sand pouring basin placed on top of the cope. In fact the dry sand pouring basin is used in a great many instances for its convenience and the insurance it affords against the entrance of slag or other foreign material. Cost of using that device is almost negligible.



Wheel weight casting is poured through two pop gates fed from a pouring basin on the cope

Loose Sand Washed in with Metal

Q.—For your inspection we are submitting a small brass casting with a defect for which we cannot account. Four patterns on a cast matchplate are molded in a 12 x 18-in. flask, 3-in. drag, 4-in. cope. Sand is No. 1 Albany showing moisture content 6.6 per cent, permeability 18 and green strength 5. The metal is 88-10-2 poured at a temperature of 2200 F. The metal is covered with flux and is melted in an oil-fired furnace. A pea-size pill of 15 per cent phosphorus copper is added to 90 lb metal. We also shall appreciate information where we can order a supply of the proper material for producing a dark brown finish on bronze tablets.

A.—The defect on the casting is caused by loose sand floating on the metal. Examination of the casting shows where small quantities of sand have been washed away at several points on the sprue, immediately under the sprue and at the sides of the runner near the sprue.

Several causes might be responsible. The most probable is hard pouring, especially at the beginning. Apparently the metal composition and melting practice are satisfactory. Moisture content of the sand is a little high for this particular group of castings which almost cover the joint area. Sand with a moisture content of 5 per cent would serve more satisfactorily.

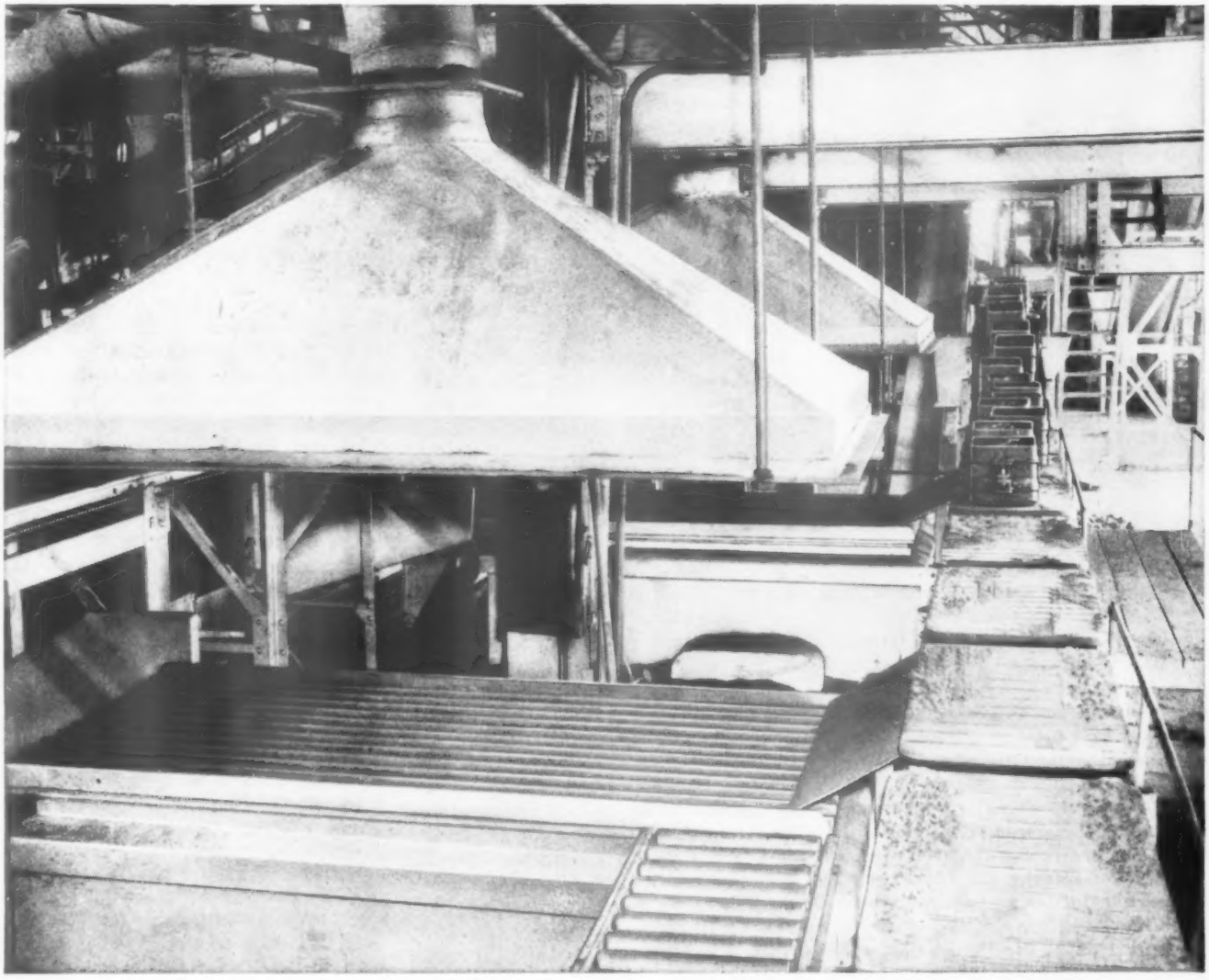
Dip or wash usually employed to produce a dark brown color on bronze castings, particularly tablets, is potassium sulphide, known more familiarly as liver of sulphur. It is diluted with water in various proportions, depending on the color desired on the casting. Length of immersion time also will vary depth of color.

Bed in Cupola May Be Too Low

Q.—We operate a small foundry pouring 4 tons a day and are having trouble in that the first 300 lb of iron we take from the cupola has a white fracture. Cupolas are lined down to 32 in. with a 48-in. bed. First charge is 600 lb with succeeding charges of 500 lb with 80 lb splits. Wind is on 15 minutes before first tap after which iron runs continuously.

A.—Several possibilities as to why the first iron down in the cupola is white come to mind. One is that the arrangement of the iron charge may be such that the low-silicon materials are placed first on the bed, and melt first. Another is that the bed is not burned through properly, causing the iron to lose heat in its passage down to the spout. Third is that the bed is too low, and the first iron melted tends to be oxidized. Excess coke in the following splits builds up the bed to the proper point, and probably beyond, but is not noticeable on the short heat.

While you mention that the bed is 48 in. deep, no indication is given that it is that distance above the tops of the tuyeres. We believe that better results will be obtained by making all iron charges 500 lb instead of a first 600-lb charge followed by 500-lb charges. You might check the bed height by looking in the tuyeres and observing when the first iron trickles by; it should be in about 6 minutes after the blast is on. In 10 minutes iron should appear at the taphole. If the times are longer than indicated the bed is too high, and vice versa.



NOW! Shake out castings right on your production line

Picture this new shakeout in your plant . . . *precision-timed* to a modern production line!

Imagine loaded flasks moving along your conveyor in a steady flow. Think of flasks moving with the security of proved mechanism—not with the uncertainty of gravity. They pass to the shakeout and continue to travel across at exactly the same rate of speed as the conveyor.

Sand is removed! Flasks and castings come clean without damage! They move to the next conveyor . . . and keep right on going!

All this is made possible by the new Robins Self-Discharging Floatex Shakeout. Here's streamlined production-line technique at work right in your own foundry!

The patented Robins mechanism vibrates with an elliptical motion. This not only produces effective shakeout vibration, but also makes flasks move steadily and positively forward.

This Self-Discharging Floatex Shakeout is the only unit that gives positive, horizontal flow. It is synchronized with the rate of speed of your foundry conveyor. And your flasks move at conveyor level.

So call a Robins engineer whenever you are looking for a new and better way to speed your foundry operation. Write today to Robins Conveyors Division, Passaic, New Jersey, for complete information about the Robins Floatex Shakeout.

ROBINS

FLOATEX SHAKEOUT

3 TYPES DESIGNED TO HELP YOU 6 WAYS:

STATIONARY PORTABLE SELF-DISCHARGING

1. Save Time
2. Reduce Labor
3. Help Sand Recovery
4. Cool Hot Sand
5. Minimize Flask Breakage
6. Improve Working Conditions

ROBINS CONVEYORS DIVISION **HEWITT-ROBINS INCORPORATED**

Men OF INDUSTRY

LEE C. WILSON, Reading, Pa., has been made a consultant for the National Security Resources Board, Production Division, Manufacturing Group, and now is engaged in a special survey of the foundry industry for the government. Mr. Wilson was educated in the schools of New Haven, Conn., and in the Sheffield Scientific School of Yale University from which he was graduated in 1907. He was connected with the sales department of the Harbison-Walker Refractories Co. for a period of years in Pittsburgh, Chicago, New York and the New England districts. Later he joined the Chain Belt Co., Milwaukee, as assistant to the vice president and then became general sales manager. Transferring to the Federal Malleable Co., Milwaukee, as secretary, he later was elected vice president and general manager, and held that position until he was made general manager, Reading Steel Castings Division, American Chain & Cable Co., Reading, Pa. In 1946 he established an engineering sales agency to serve the foundry and metalworking industries. Mr. Wilson is a past president of the American Foundrymen's Society and has been active in the technical work of the Steel Founders Society of America.

In Washington he is located in Room 186, Old State Building, and his telephone is Sterling 4700, Extension 3450.

♦ ♦ ♦

Orville C. Hoover has been appointed superintendent of the new foundry under construction by Wysong & Miles, Greensboro, N. C., for production of semi-steel, brass and aluminum castings. Mr. Hoover has had 30 years of experience in the foundry industry including association with Perfect Circle Co., Newcastle, Ind.; Shepard Elevator Co., Cincinnati; Acme Foundry Co., Detroit; and Thomas Foundries Inc., Birmingham.

♦ ♦ ♦

Joseph Chini has been appointed superintendent of the foundry division, Sperry Gyroscope Co., Division of the Sperry Corp., Great Neck, N. Y., succeeding **Stanley E. Tims,** who has resigned. After studying metal processes at the Velberter Hochschuel, Germany, Mr. Chini came to the United States and has specialized in foundry techniques for over 30 years. Prior to joining the Sperry organization in 1943, as general foreman, he was superintendent of the Howard Foundry, Chicago.

♦ ♦ ♦

Joseph S. Hornstein, who has been elected chairman of the Northwestern Pennsylvania Chapter of the American Foundrymen's Society for 1948-49, is vice president, general manager ager of the Yost Mfg. Co., Meadville, leable Iron Co., Meadville, Pa. Mr. Hornstein was assistant to the manager of the Yost Mfg. Co., Meadville, from 191(-25, and served as assistant to the manager of the Simplex Mfg. Co., a subsidiary of Meadville Malleable Iron Co., for the next 4 years. In 1929 he became purchasing agent of the latter company, was elected secretary and general manager in 1936, and vice president in August, 1947, retaining the offices of general manager and secretary. He served as vice chairman of the Northwestern Pennsylvania Chapter last year.

♦ ♦ ♦

John Bing, formerly Milwaukee district manager, A. P. Green Fire Brick Co., has resigned to become general manager, Metropolitan Refractories Corp., 15 Park Row, New York. Mr. Bing was born in Cleveland and was graduated from Ohio State University in 1928 with a degree in business administration. He represented the A. P. Green Fire Brick Co. in Jacksonville, Fla. until May, 1929, when he was sent to Green Bay, Wis., for a year. Following a year in San Francisco as company representative he was appointed district manager in Milwaukee in 1931. Mr. Bing was secretary of the Wisconsin Chapter of the American Foundrymen's Society 1942-43, vice president 1943-44, and president 1945-46 He served as chairman of the annual Wisconsin Regional Foundry Conference in 1945.

♦ ♦ ♦

P. F. Bauer has been named manager of a newly formed central region of Allis-Chalmers Mfg. Co.'s general machinery division, with headquarters in Cleveland. The new region comprises district office territories of Cleveland, Toledo, O., Pittsburgh, Youngstown, Wheeling, W. Va., Cincinnati, Detroit, Grand Rapids and Jackson, Mich. Mr. Bauer joined Allis-Chalmers in 1928, and served as a salesman in the Pittsburgh district until 1942, when he was named manager of the indus-

(*Continued on page* 110)

LEE C. WILSON

ORVILLE C. HOOVER

JOSEPH CHINI

JOSEPH S. HORNSTEIN

Our Own Source of Coal

Our Own Source of Ore

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America's largest completely independent and entirely integrated merchant iron producer.

WOODWARD IRON COMPANY

WOODWARD, ALABAMA

Independent Since 1883

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(*Continued from page* 108)

trial sales department with headquarters in Milwaukee. He is vice chairman of the manufacturers division of the American Mining Congress, and has served as a director of the Foundry Equipment Manufacturers Association.

♦ ♦ ♦

William B. Sullivan, pioneer in the development of high temperature alloy castings, has retired as manager of alloy sales, Lebanon Steel Foundry, Lebanon, Pa. Mr. Sullivan devoted several years to design of special machinery and tools following completion of his formal education in metallurgy and engineering, and subsequently was sent to Panama by Carpenter Steel Co., Reading, Pa., to set up tool steel specifications which were used in construction of the canal. Later he became general manager of the Rich Tool Co., Chicago, where he was responsible for extensive research work in the fields of heat resistant and corrosion resistant alloys. In 1928 he organized Michiana Products Corp., Michigan City, Ind., for the manufacture of high temperature alloy castings, and joined the executive staff of Lebanon Steel Foundry in 1935. He has made many periodic trips to Europe to keep in touch with metallurgical developments there. He was appointed National Recovery Administration chairman for the steel industry's alloy casting group and in 1933 was one of the organizers of the Alloy Casting Association, predecessor of the Alloy Casting Institute, which he served as president for 2 terms, and of which he is an honorary life member.

♦ ♦ ♦

Edward H. Platz Jr. has been appointed manager of alloy sales, Lebanon Steel Foundry, succeeding Mr. Sullivan. Mr. Platz was graduated from Rensselaer Polytechnic Institue in 1916, where he remained as instructor in the mechanical engineering department until he entered World War I service. In 1920 he joined the Duriron Co., Dayton, O., and specialized in applications of corrosion resistant products and developmental work in the field of high alloy castings. Later he served as district manager of the company's offices in New York, Chicago and Philadelphia. In 1939 Mr. Platz joined the executive staff of Lebanon Steel Foundry where he has specialized in engineering and metallurgical application of alloy castings to jet engine and gas turbine developments as well as development of stainless steel and other high alloy castings for a wide variety of industrial uses in which high temperature and corrosion resistance are paramount requirements.

♦ ♦ ♦

R. E. Dahlin has been appointed western representative of Wellman Bronze & Aluminum Co., Cleveland, with headquarters in Dallas, Tex. Mr. Dahlin, who was born and educated in Superior, Wis., later spent 6 years in Los Angeles where he took specialized courses in heat treating of metals, steel forging, engineering and business law. For the past 20 years he has resided in Dallas, devoting his time to affiliations with industrial and metal products manufacturers in Oklahoma and Texas.

♦ ♦ ♦

Fred W. Fuller, chairman of the Central Ohio Chapter of the American Foundrymen's Society for 1948-49, is special representative in northern Ohio for National Engineering Co., Chicago, and Foundry Equipment Co., Cleveland. Mr. Fuller, a native of Chicago, attended Northwestern University, Lewis Institute and Armour Institute. He began his foundry career at Chicago Steel Foundry, Chicago, in 1935. He joined National Engineering Co. in 1937, was appointed assistant sales manager in 1942, and two years later became district manager in Ohio, part of western Pennsylvania and northern Kentucky. In March of this year he established his own sales agency as special representative for National Engineering Co. and Foundry Equipment Co. He served as vice chairman of the Central Ohio Chapter last year.

♦ ♦ ♦

Crozier S. Wileman has been appointed district sales manager, Wilkes-Barre, Pa. plant, Link-Belt Co., Chicago, succeeding **A. C. Williams,** who has retired after 43 years of service. Mr. Wileman has been associated with the company since 1924, serving in engineering and sales capacities. He will be assisted by **Alton H. Ziegler,** recently transferred from the Philadelphia district sales office.

♦ ♦ ♦

W. C. Bryant, for the past two years a group leader in the research department, Swan-Finch Oil Corp., New York, has been promoted to Chief Research Chemist. Previously, Mr. Bryant had spent eight years in the production division as a control and chief chemist.

♦ ♦ ♦

Harold F. Smiddy has been appointed general manager of the Chemical Department of General Electric Co., Schenectady, N. Y., with headquarters in Pittsfield, Mass. Mr. Smiddy was graduated from Massachusetts Institute of Technology in 1920. He was an executive of Electric Bond & Share Co. and operating manager of West Penn Power Co., and served as a director and head of the operating and sales departments of Ebasco Services Inc. From 1943 until he joined General Electric he was a

(*Continued on page* 114)

WILLIAM B. SULLIVAN

EDWARD H. PLATZ JR.

R. E. DAHLIN

FRED W. FULLER

Look at that detail

THERE is detail to look at when you use Krause Truscor or Amerikor Cereal Binders in the making of your cores.

Added to a core mix, Truscor and Amerikor give a better surface finish . . . more accurate handling of detail.

Accuracy of detail results from greater flowability. Extra green strength, improved collapsibility, faster operations, less wastage — these are other advantages of these superior cereal binders made from corn.

Specify Krause Truscor or Amerikor on your next order — Truscor if you like a light-weight binder; Amerikor, if you prefer a heavier mixture.

CHAS. A. KRAUSE MILLING CO., MILWAUKEE 1, WIS.
World's largest millers of dry corn.

CEREAL BINDERS

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A. L. Cavedo & Son, Inc. Richmond 21, Va.
Foundry Supplies Co. Chicago 16, Ill.
J. H. Hatten, Lansdowne, Pa.
Independent Foundry Supply Co., Los Angeles 11, Calif.
Joseph B. Meier, 96 N. 18th St., East Orange, N. J.
Marthens & Co., Moline, Ill.
Carl F. Miller & Co. Seattle 4, Wash.
Milwaukee Chaplet & Mfg. Co., Milwaukee 4, Wis.
Pacific Graphite Works Oakland 8, Calif.
Porter-Warner Chattanooga 2, Tenn.
Smith-Sharpe Co. Minneapolis 14, Minn.
Frederic B. Stevens, Inc. Buffalo 12, N. Y.
Frederic B. Stevens, Inc. Cleveland 14, Ohio
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120 bathtubs cleaned hourly

A Wheelabrator Monorail Cabinet used by a leading manufacturer of sanitary ware (name on request) cleans 120 bath tubs hourly prior to enameling. The machine is also designed for handling small ware such as sinks and wash bowls. A higher cleaning production is obtained on the smaller pieces since 8 sinks or 6 wash bowls can be hung on each of the conveyor hooks of the monorail.

Upholding the slogan "Durable as the Pyramids"

When your trademark reads, "Durable as the Pyramids" you've got to be sure your processing is right. That is why Port Hope Sanitary Mfg. Co., one of the largest producers of cast iron enamelware in Canada, uses a 5-wheel Wheelabrator Monorail Cabinet for cleaning their production. Although large bath tubs constitute the bulk of the castings produced at this plant, other sanitary ware being Wheelabrated prior to enameling, includes lavatories, kitchen sinks, laundry trays, closet tanks, drain boards, urinals, etc. A cleaning production of one hook a minute, containing either a large bath tub or 9 smaller pieces, is maintained on all types of work. The Wheelabrator is also used for de-enameling. Prior to the installation of the Wheelabrator, a number of Airblast Rooms were utilized.

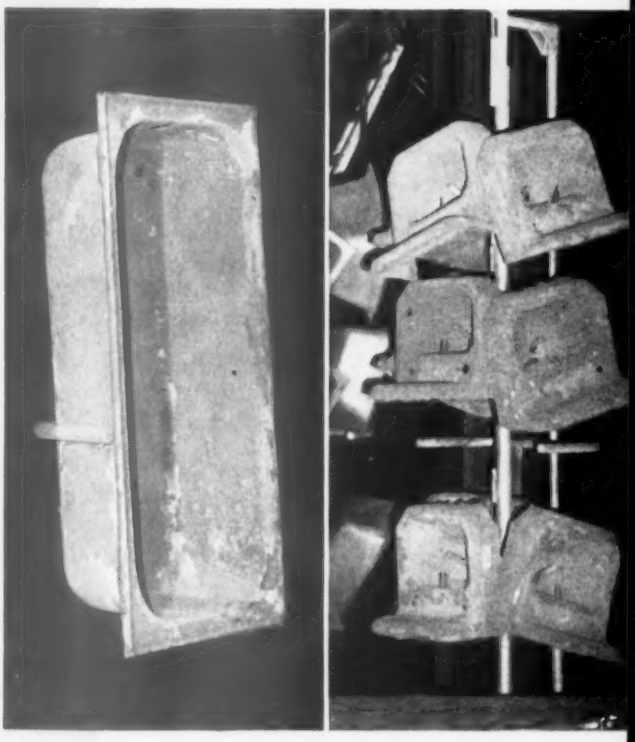
Bulletin 354 "Cleaning Problems Solved in the manufacture of Sanitary Ware" will be sent to you upon request. Write for your copy today.

WHEELABRATE sanitary ware for LOW COST CLEANING

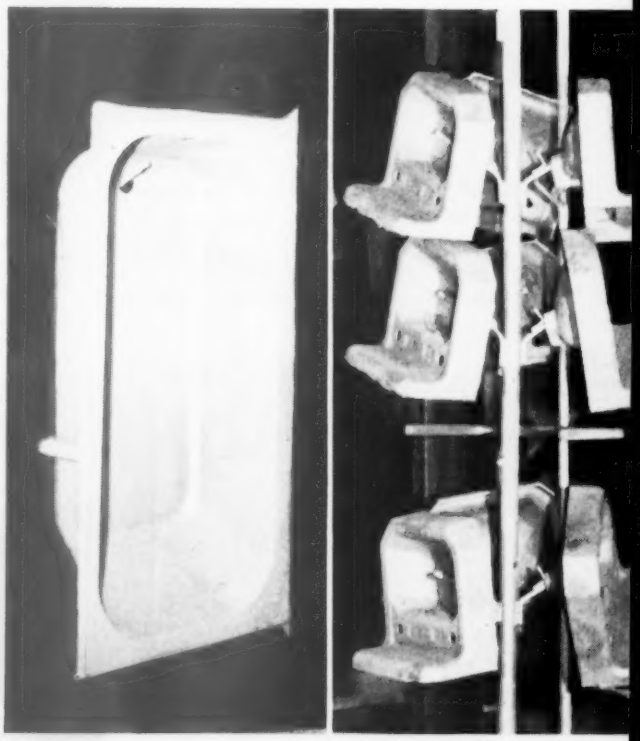
and the right finish to anchor enamel in a permanent bond

For sanitary ware to look and serve its best, the finish must be of perfect quality. The slightest imperfection detracts from the band-box appearance that is so essential to lasting beauty. The critical factor is a well-prepared, perfectly clean surface that will anchor the enamel in a permanent bond.

To insure perfection in this important phase of production a good many of the important sanitary ware plants have standardized on Airless Wheelabrating . . the fast, low-cost cleaning process used by more than 5,000 plants throughout the world. The typical case histories shown at left will illustrate the type of performance to expect when *you* change to Wheelabrating.



BEFORE CLEANING



AFTER CLEANING

American
WHEELABRATOR & EQUIPMENT CORP.
(FORMERLY AMERICAN FOUNDRY EQUIPMENT CO.)
505 S. Byrkit St., Mishawaka 2, Indiana

AIRLESS BLAST EQUIPMENT

(*Continued from page* 110)

partner in Booz, Allen & Hamilton, industrial management consultants. Since March he has been on the president's staff of General Electric.

♦ ♦ ♦

Arthur F. Dockry, who is serving as president of the New England Foundrymen's Association for the current year, is foundry superintendent, H & B American Machine Co., Pawtucket, R. I. Mr. Dockry attended Rhode Island School of Design while serving his apprenticeship as a patternmaker. He became associated with H & B American Machine Co. in 1927 as foreman patternmaker and in 1938 became superintendent of the foundry and pattern shop. During this period he was enrolled in metallurgy and business administration courses at Brown University. Last year Mr. Dockry served as vice president of the New England Foundrymen's Association. He also is a member of the Specifications Committee of the Gray Iron Founders' Society.

♦ ♦ ♦

Dr. James T. MacKenzie, recently elected chairman of the Birmingham Chapter of the American Foundrymen's Society for 1948-49, is technical director and a member of the board of directors, American Cast Iron Pipe Co., Birmingham. Dr. MacKenzie was graduated from the University of the South, Sewanee, Tenn., in 1912. In 1930 he was awarded the honorary degree of Doctor of Science by that University and recently received the same degree from the University of Alabama. He joined American Cast Iron Pipe Co. in 1912 and in 1914 was made chemist in charge of melting and mixing. In 1918 he was relieved of routine duties to devote his entire time to experimental and research work. Results of his research work have been incorporated in papers presented before various technical groups in which he holds active membership. For many years he has served on committees of the AFS, being a former chairman of its Gray Iron Division and at present a member of the advisory group of that division. In 1927 and 1938 he was author of the AFS exchange papers presented before the Institute of British Foundrymen. Dr. MacKenzie is also an active member of the American Society for Testing Materials and has been chairman of its Committee A-3 on Cast Iron since 1940.

♦ ♦ ♦

Robert A. Webber has been appointed manager of the Electric Furnace Division, Electro Refractories & Alloys (Canada) Ltd., new subsidiary of Electro Refractories & Alloys Corp., Buffalo. Following graduation from University of Toronto, Mr. Webber joined the staff of the Exolon Co., Therold, Ont., in 1936, and became plant superintendent in 1942. He left Exolon Co. this spring to assume his new responsibilities with Electro Refractories & Alloys (Canada) Ltd. at Cap-de-la-Madeleine, Quebec.

♦ ♦ ♦

Laurence J. White has been appointed Chicago area representative with office in the Uptown Bank Bldg., for Wellman Bronze & Aluminum Co., Cleveland. Mr. White, a graduate of Northwestern University, has been associated with the metal and machinery industry for 20 years.

♦ ♦ ♦

William Arthur has been named manager of the new Mid-Atlantic region of Allis-Chalmers Mfg. Co.'s general machinery division, with headquarters in Philadelphia. The new area embraces territory now covered by Philadelphia, Wilkes-Barre, Pa., Baltimore, York, Pa., Richmond, Va., and Charleston, W. Va. The York and Charleston offices, managed by **G. E. Conn** and **R. L. Halsted,** respectively, formerly branch offices, become district offices under the regional plan. Mr. Arthur, who has been Philadelphia office manager for 10 years, is succeeded by **Frank Freyler,** manager of the Cincinnati district office since 1944. **W. F. Daly,** since 1943 manager of the power section of the company's steam turbine department, becomes manager in Cincinnati.

♦ ♦ ♦

William J. Maton, for 44 years foundry superintendent, Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., has retired. Mr. Maton joined the company at the age of 14, as an office boy. He served as paymaster at 16, purchasing agent at 18, and later was transferred to the foundry where he became superintendent in 1904. An active foundryman, Mr. Maton served as president of the Connecticut Foundrymen's Association from 1932 until 1935.

♦ ♦ ♦

George M. Hayes, foundry engineer and metallurgist, has been appointed sales engineer and consultant, Foundry Service Co., Birmingham. Mr. Hayes has had several years of practical and technical experience with large Southern foundries, and has left the post as coordinator in the foundry division of the Veterans Training Program, University of Alabama.

♦ ♦ ♦

Carl E. Staninger has joined **Alex Gordon** and **James P. Kinney** as partner and vice president of Gordon, Kinney & Staninger Inc., 410 Stephenson Bldg., Detroit, representative in Michigan and northeast Ohio for the Automatic Transportation Co., Chi-

(*Continued on page* 116)

ARTHUR F. DOCKRY

DR. JAMES T. MacKENZIE

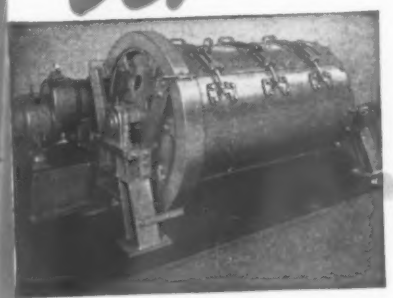
ROBERT A. WEBBER

LAURENCE J. WHITE

For Cleaning *Faster, Better* and at *Lower Cost*

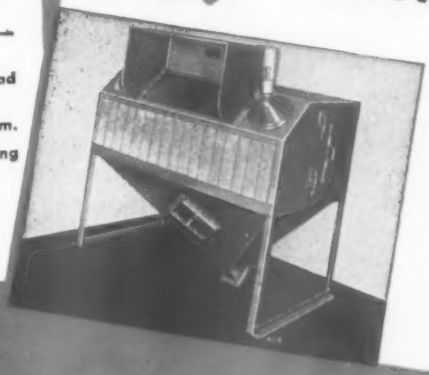
Choose from the SLY Complete Line of Foundry Cleaning Equipment

SLY TUMBLING MILLS



1. Heavy forged steel trunnions, extra heavy roller bearings.
2. Special door locks — easily operated.
3. Extra heavy gearhead motor.
4. Integral motor platform.
5. Loading and unloading from either side.

SLY BLAST CABINETS



1. Two lights mounted at front to illuminate castings.
2. Operator's eyes shielded by protective hood.
3. Easy loading and unloading of castings.
4. Used for thorough cleaning of small and intricate parts, or as an auxiliary to larger units.

SLY BLAST ROOMS

1. Overall down-draft ventilation.
2. Ample illumination.
3. Lined throughout with 3-16" wear plates.
4. Floor of grating and perforated plates.

SLY "UNIT" DUST COLLECTORS

Small, compact cloth type dust filters for grinders and other small dust sources. Made in ten sizes for air volumes from 400 to 6000 C.F.M.

SLY DUST FILTERS

1. More filter cloth—hence greater filtering capacity.
2. Filter bags under tension (patented) insure: (a) minimum resistance to air flow, and (b) complete dust removal.
3. Simpler shaker mechanism—less moving parts, less maintenance.
4. Bags more easily replaced.
5. Automatic control — any degree.

SLY BLAST MILLS

1. Handles quantities of castings, forgings, stampings, hardened steel parts.
2. Tilted barrel with rolling action.
3. Convex perforated bottom plate forms bottom of barrel.
4. Work is constantly turned bringing bottom pieces to top.
5. Stationary head of barrel has large door for loading.

70 YEARS OF SERVICE TO THE FOUNDRY INDUSTRY

THE W. W. SLY MANUFACTURING CO.

4753 TRAIN AVENUE • CLEVELAND 2, OHIO

Representatives in New York • Chicago • Philadelphia • Detroit • St. Louis Toronto • Minneapolis • Cincinnati • Rochester • Los Angeles • Birmingham

(*Continued from page* 114)

cago. Until recently Mr. Staninger was district manager of the Clark Equipment Co., Battle Creek, Mich., with which he has been associated for 28 years. Mr. Gordon, president of the expanded organization, has represented Automatic Transportation Co. in the materials handling industry for 33 years.

♦ ♦ ♦

William G. Brown has been appointed sales manager for Howard Foundry Co.'s six foundries located in Chicago, Los Angeles and Belmont, Calif. Mr. Brown has been Chicago district manager for Bohn Aluminum & Brass Corp., Detroit, for the past 14 years. Prior to that he was sales manager, Werra Aluminum Co., Waukesha, Wis.

♦ ♦ ♦

J. M. Haughey, formerly sales manager of the Industrial Division, Packard Motor Car Co., Detroit, has been appointed to the newly created position of sales manager, Washington Iron Works, Seattle. Mr. Haughey will direct sales activities of industrial equipment for the company, facilities of which include steel and iron foundries, a pattern shop, engineering and research staff, etc.

♦ ♦ ♦

Max T. Ganzauge, recently elected president of the Rochester Chapter of the American Foundrymen's Society for 1948-49, is foundry superintendent, General Railway Signal Co., Rochester, N. Y. Mr. Ganzauge, the son of a stove manufacturer, was born in Germany and introduced to the foundry industry at an early age. He was graduated from technical college in Stuttgart in 1923 and came to the United States the same year. He was associated with various gray iron, brass and aluminum foundries in New York and New Jersey until 1933, when he was appointed assistant superintendent of Goulds Pumps Inc., Seneca Falls, N. Y. In 1942 he became foundry superintendent of the General Railway Signal Co. In 1945 he was sent on a technical mission to Germany and Austria by the United States government. A past director of the Western New York Chapter of the AFS, Mr. Ganzauge was elected one of the Rochester Chapter's first directors when it was organized in 1943 and served as its vice president last year.

♦ ♦ ♦

Edward H. Taylor, who has been elected chairman of the Canton District Chapter of the American Foundrymen's Society for 1948-49, is plant engineer, the F. E. Myers & Bros. Co., Ashland, O. Mr. Taylor was graduated from Cornell University in 1912 with a degree in civil engineering. He has been associated with F. E. Myers & Bros. Co. since 1926. Active in the Canton District Chapter since its organization, he has served as a director, chairman of the Educational Committee and as vice chairman last year. He also acts as one of the industrial advisors to the Ohio State University Student Chapter of the AFS.

♦ ♦ ♦

Dr. Haldon A. Leedy has been named director of the Armour Research Foundation of Illinois Institute of Technology, Chicago. He will administer the industrial research program as successor to Dr. Jesse E. Hobson, who left last spring for Stanford University. Dr. Leedy had been acting director of the foundation since March.

♦ ♦ ♦

Robert W. Frank has been appointed president and general manager of Lewis Foundry & Machine Division of Blaw-Knox Co., Pittsburgh, succeeding **F. E. Walling,** who has resigned. Mr. Frank, who was graduated from Pennsylvania State College in 1931 with a degree in metallurgical engineering, has been assistant general manager of the Lewis Foundry & Machine Division for the past 3 years. Prior to that he was superintendent of blooming and billet mills at the Duquesne Plant of Carneigie-Illinois Steel Corp., Pittsburgh.

♦ ♦ ♦

Donald L. DeLand has been appointed export manager of the Mid-West Abrasive Co., with headquarters in the export division which has been moved from Detroit to tne main offices in Owosso, Mich. Mr. DeLand, a native of Appleton, Wis., received his formal schooling and engineering training in his home state. Prior to his association with Mid-West Abrasive Co. as assistant export manager, he had 1½ years of service in India and China with Army Air Forces.

♦ ♦ ♦

Walter Morrison, public relations and advertising consultant, writer and radio executive, has been appointed director of public relations for the American Society for Metals, Cleveland, succeeding **Graves Taylor,** who has resigned. Mr. Morrison will supervise newspaper, magazine, radio and other types of informational material relating to ASM in addition to extending full co-operation to the society's public relations chairmen.

♦ ♦ ♦

Crozier S. Wileman has been appointed district sales manager at the Wilkes-Barre, Pa., plant of Link-Belt Co., Chicago, succeeding **A. C. Williams,** who has retired following 43 years of service. Mr. Wileman entered the Philadelphia plant of the company in 1924, as tracer and detailer in the engineering department, and recently was district sales en-

(*Continued on page* 119)

WILLIAM G. BROWN

J. M. HAUGHEY

MAX T. GANZAUGE

EDWARD H. TAYLOR

Maintaining casting soundness . . . run after run . . .

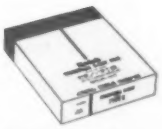
Many foundries have eliminated some of their most troublesome casting problems . . . have provided engineer and foundryman with more useful information . . . and have obtained more sound yield per melt . . . through radiography.

. . . assured by pilot and spot radiographic examination

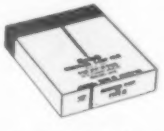
Radiography of the pilot castings helps get sound production runs going sooner . . . then radiographic spot testing of the runs keeps quality levels up to standard. Result: by increasing yield, radiography more than pays its own way.

For maximum radiographic visibility . . . use Kodak Industrial X-ray Films

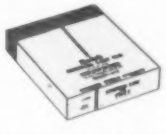
Kodak Industrial X-ray Film, TYPE A . . . for x-ray and gamma-ray work in sections where fine grain and high contrast are desirable for maximum sensitivity at moderate exposure times.



Kodak Industrial X-ray Film, TYPE K . . . designed for gamma-ray and x-ray radiography of heavy steel parts, and of lighter parts at limited voltages where high film speed is needed.



Kodak Industrial X-ray Film, TYPE M . . . first choice in critical inspection of light alloys, thin steel at moderate voltages, and heavy alloy parts with million-volt equipment.



Kodak Industrial X-ray Film, TYPE F . . . with calcium tungstate screens—primarily for radiography of heavy steel parts. For the fastest possible radiographic procedure.

They provide the high radiographic sensitivity—the combination of speed, contrast, and fine grain—required for the detail visibility you need in critical examination of castings.

For complete information on the types best adapted to your job, see your local x-ray dealer—or write to

Eastman Kodak Company
X-ray Division, Rochester 4, N. Y.

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RADIOGRAPHY

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AUTOMATIC FORK TRUCK

AUTOMATIC TRANSPORTER

Battery Electric Trucks and EXIDE-IRONCLAD® BATTERIES

Speed up materials handling . . . cut costs

Every day, more and more companies are discovering the faster, safer and more economical way to handle materials. They are giving the job of lifting, hauling and stacking to the efficient battery electric truck. Time is being saved . . . more tons moved per man per hour. Handling costs have been cut as much as 50%. And more storage space is being utilized by high tiering.

When electric trucks are powered with dependable Exide-Ironclad Batteries, they keep on the job day after day . . . and all day long.

The unique construction of Exide-Ironclad Batteries results in all four of the vital characteristics of a storage battery: *high power ability, high electrical efficiency, ruggedness* and *long life.*

Speed up your material handling. Cut handling costs. Put Exide-Ironclad Batteries and Battery Electric Trucks to work in your plant.

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Cleveland Public Auditorium
September 28, 29, 30,
October 1st.

1888 . . . Dependable Batteries for 60 Years . . . 1948

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • *Exide Batteries of Canada, Limited, Toronto*

(*Continued from page* 116)

gineer for all company products in the Philadelphia district sales office. **Alton H. Ziegler,** who has recently been transferred from the Philadelphia district sales office, will assist Mr. Wileman at Wilkes-Barre.

♦ ♦ ♦

W. M. Ball Jr. has joined the technical staff of R. Lavin & Sons Inc., Chicago, as metallurgist and foundry consultant. Following graduation from Carnegie Institute of Technology Mr. Ball was supervisor in the brass foundry of the East Pittsburgh plant of Westinghouse Electric Corp. Later he became assistant superintendent of the steel foundry of Morgan Engineering Co., Alliance, O., and superintendent of it's iron and brass foundry. For the past 27 years he has been superintendent of the foundry, Magnus Brass Division, National Lead Co., Cincinnati, formerly the Edna Brass Mfg. Co. Mr. Ball has contributed much time and effort to the activities of the American Foundrymen's Society, American Society for Metals, Engineering Society of Cincinnati and the Foremans' Club of America.

♦ ♦ ♦

O. E. Sunstedt, recently elected chairman of the Saginaw Valley Chapter of the American Foundrymen's Society for 1948-49, is vice president and general manager, General Foundry & Mfg. Co., Flint, Mich. Mr. Sunstedt was born in northwestern Michigan and attended public schools in East Jordan, Mich. He entered the foundry industry in 1916 at Michigan Malleable Iron Co., at Detroit. He served in various capacities at Lincoln Motor Co., Saginaw Malleable Iron Co., Flint Malleable Castings Co., and General Foundry & Mfg. Co., where he bacome vice president and general manager in 1946. Mr. Sunstedt served as vice chairman of the Saginaw Valley Chapter last year. He is also a member of the American Society for Metals.

♦ ♦ ♦

R. C. Shepherd, who was awarded the British Foundry Medal at the recent annual meeting of the Institute of British Foundrymen, is general foundries manager of Ruston & Hornsby Lt., Lincoln. Mr. Shepherd, a native of Birmingham, England, became chief metallurgist of the

R. C. SHEPHERD

company in 1923, was appointed foundry manager of its Lincoln foundry in 1932, and manager of all foundries in 1944. During that year he made an extended tour of American foundries under the auspices of the British Ministry of Supply and in 1946 was leader of a group which investigated German gray iron foundries, for the Ministry. He is a member of the British Cast Iron Research Association's Development, Engineering Castings, Fuels and Furnace Committees. At the recent annual conference held in London he was elected to the IBF Council.

♦ ♦ ♦

Elmer C. Zirzow, formerly coreroom foreman, National Malleable & Steel Castings Co., Cleveland, has been appointed sand technologist in the testing and research laboratories, Deere & Co., Moline, Ill., where he will be engaged in research on sand problems and will act in an advisory capacity to the nine gray iron and two malleable iron foundries of the company. Mr. Zirzow has been an active member of the Northeastern Ohio Chapter of the American Foundrymen's Society for many years and was elected president of the group at the annual election in May. As vice president of the chapter last year, he served as chairman of the first Ohio Regional Foundry Conference held in Cleveland in March.

♦ ♦ ♦

Herbert J. Bauman, chairman of the Northern Illinois-Southern Wisconsin Chapter of the American Foundrymen's Society for 1948-49, is a representative in the core oil division of Smith Oil & Refining Co., Rockford, Ill. Following a vocational training school course, Mr. Bauman spent 2 years in the pattern department of General Malleable Corp., Waukesha, Wis. He joined Ebaloy Foundries Inc., Rockford, Ill., in 1938, where he worked in the pattern shop, aluminum and magnesium foundry, and laboratory. During the recent war he became factory manager there. He has been associated with Smith Oil & Refining Co. since May, 1948. Mr. Bauman has been an active member of the Northern Illinois-Southern Wisconsin Chapter and served as vice chairman last year.

♦ ♦ ♦

M. A. Carlson, formerly vice president, has been named president, Fresno Brass Works, Fresno, Calif. **Martin Schacht,** secretary - treasurer, succeeds Mr. Carlson as vice president, and will continue as secretary of the company. **Miss Catherine L. Duffy** has been made treasurer. Mr. Carlson, one of the founders of the company, has been associated with

W. M. BALL JR.

O. E. SUNSTEDT

ELMER C. ZIRZOW

HERBERT J. BAUMAN

the foundry industry for 21 years. Previous connections include: Western Brass Works, Los Angeles: Berkeley Brass Foundry Co., Berkeley, Calif.; and Aluminum Co. of America. Mr. Schacht, a foundryman for about 12 years, spent 7 years with Stephens-Adamson Mfg. Co., Los Angeles, in engineering and administrative work. Later he was associated with Peninsula Foundry & Machine Works, Pacific Chain & Mfg. Co., Pacific Steel Foundry Co., and Shofner Iron & Steel Works, all of Portland. Miss Duffy, who joined the company shortly after it was founded, was formerly associated with several Fresno organizations in an auditing and financial administration capacity.

♦ ♦ ♦

Clarence L. Lear, for the past 2 years foundry manager, Bloomsburg Foundry Division, General Aviation Equipment Co. Inc., Bloomsburg, Pa., has been appointed Pittsburgh representative for the core oil division of Penola Inc., Chicago. Mr. Lear took extension courses in metallurgy at Penn State College and University of Pittsburgh. Previous experience includes 12 years at the Johnstown, Pa., plant of Carnegie-Illinois Steel Corp., and 2 years at Mountain State Steel Foundries, Parkersburg, W. Va., as metallurgist. Prior to 1946 he served over 2 years in the Navy as a commissioned officer.

♦ ♦ ♦

Richard R. Williams has been appointed direct sales representative for the Toledo, O., territory, Rapids-Standard Co. Grand Rapids, Mich., manufacturers of material handling equipment. Mr. Williams attended Colgate University and was graduated from the business administration school of Michigan State College. Following graduation he was associated with J. C. Miller Co., a Michigan chemical organization and Rapids Handling Equipment Co., Grand Rapids. During the war he served for over 4 years with the quartermaster corps of the Army.

♦ ♦ ♦

Peter F. Rossman, formerly assistant to the president, Curtiss-Wright Corp., New York, has been elected president of Symington-Gould Corp., with headquarters at the general offices in Depew, N. Y. Mr. Rossmann succeeds **J. A. Sauer,** who has retired following 40 years of service with the Symington interests. Mr. Sauer will continue as a director and chairman of the finance committee.

♦ ♦ ♦

Charles Sherer, Davenport Machine & Foundry Co., Davenport, Iowa, has been elected chairman of the Quad Cities local management group of Gray Iron Founders' Society, Cleveland. Other officers elected include: **Lee White,** Climax Industries, Clinton, Iowa, vice chairman, and **John Diedrich,** Blackhawk Foundry & Machine Co., Davenport, secretary-treasurer.

♦ ♦ ♦

Ronald E. Kucher, president, Olympic Foundry Co., Seattle, has been elected chairman of the board, Washington Employers Inc., succeeding **Ferdinand Schmitz Jr.**

♦ ♦ ♦

Ernest Lancashire has joined Union Metal Mfg. Co., Canton, O. Mr. Lancashire received his metallurgical training at Sheffield University, Sheffield, England. Following affiliations with several English laboratories he came to the United States in 1923. Previous associations include American Steel Foundries, Chicago; Standard Brake Shoe & Foundry Co., Pine Bluff, Ark.; West Michigan Steel Foundry Co., Muskegon, Mich.; Detroit Steel Castings Corp., Detroit; and Clark Castings Corp., Canton, O.

♦ ♦ ♦

Edward P. Barrett, widely known for his research in the metallurgy of iron and steel, has retired as chief of the Minneapolis branch of the Metallurgical Division of the Bureau of Mines. Mr. Barrett, a graduate of Missouri School of Mines, joined the Bureau of Mines in 1916, and served successively at Bureau experiment stations in Salt Lake City, Utah; Seattle; Pittsbugh; Tuscaloosa, Ala., and Minneapolis.

♦ ♦ ♦

Jack Suttie has been appointed special grinding wheel representative in the Middle West and Southwest for United States Rubber Co., New York. Mr. Suttie has been associated with the company since 1941. Prior to that he was in charge of cleaning and finishing at the Indiana Harbor plant of American Steel Foundries, and the East Chicago, Ind., plant of Continental Foundry & Machine Co.

♦ ♦ ♦

E. J. G. Phillips, director of engineering, Richards Wilcox Mfg. Co., Aurora, Ill., has been elected president of the Monorail Manufacturers Association, New York, and **A. F. Anjeskey,** sales manager, Cleveland Tramrail Division, Cleveland Crane & Engineering Co., Wickliffe, O., vice president of the association. **E. Donald Tolles** has been re-elected secretary.

♦ ♦ ♦

William Brunkala has joined the technical staff of Stearns Magnetic Mfg. Co., Milwaukee, as assistant to **Harold W. Buus,** physicist and research engineer in charge of the laboratory. Mr. Brunkala was graduated recently from University of Minnesota school of mining and metallurgy.

♦ ♦ ♦

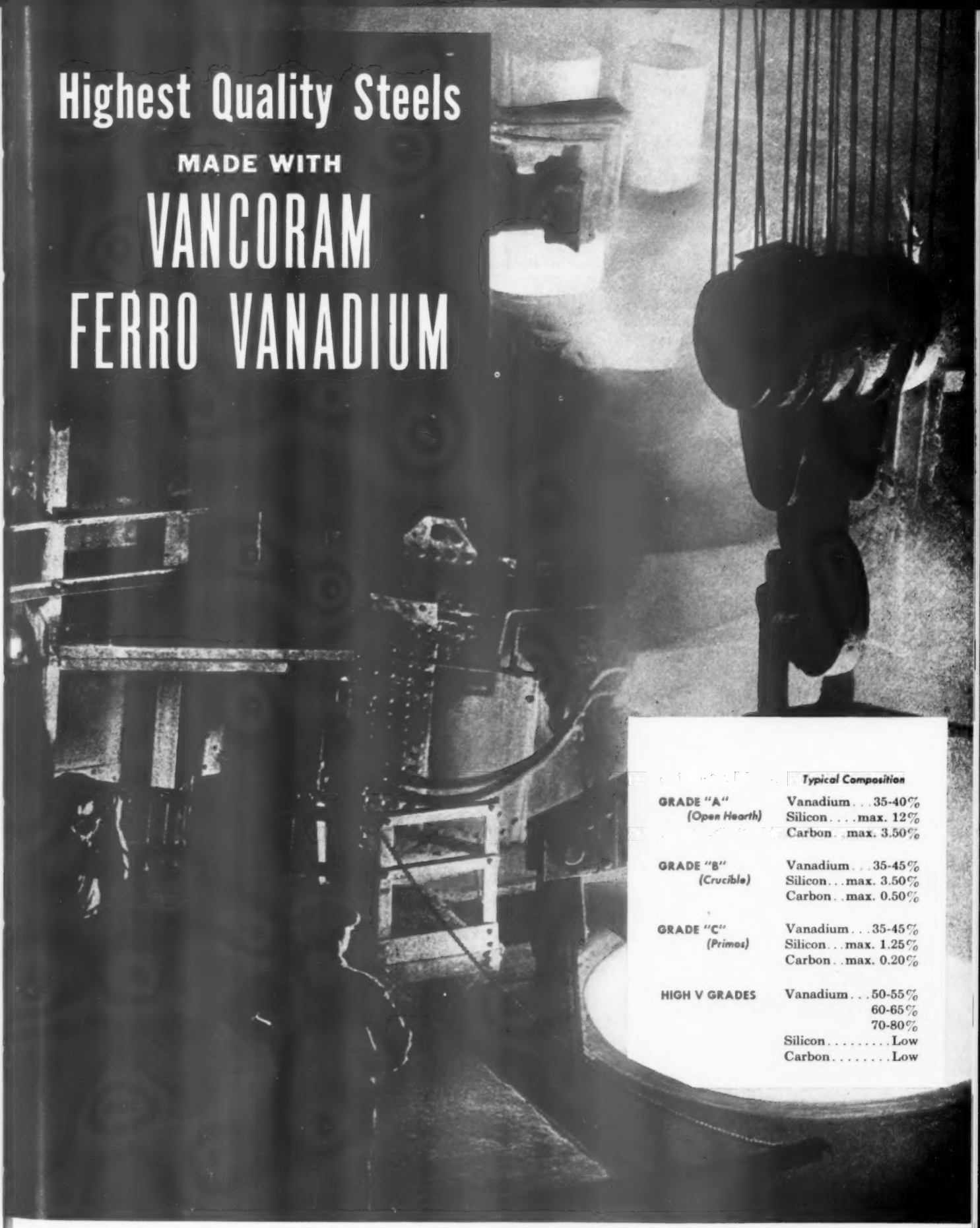
Harry E. Thiele, formerly general works manager, General Steel Castings Corp., has been elected vice president in charge of manufacturing. Mr. Thiele will be in charge of the manufacturing departments of the company's plants at Granite City, Ill., and Eddystone, Pa.

♦ ♦ ♦

George W. Smith Jr. has been elected president, De Laval Steam Turbine Co., Trenton, N. J., succeeding **H. L. Watson,** who has retired after 35 years of service. Mr. Watson will

(*Continued on page* 122)

PROMINENT FOUNDRYMEN of Milwaukee and vicinity attended the regional meeting of National Founders Association held at Pfister Hotel, Chicago, June 30. Herman Menck, Harnischfeger Corp., Milwaukee, presided as chairman. I. R. Wagner, president, NFA, outlined plans for the 51st annual meeting to be held Nov. 18 and 19 at Sheraton Hotel, Chicago. L. E. Roark, NFA executive vice president, reported on legislative affairs and association activities


Highest Quality Steels
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FERRO VANADIUM
Typical Composition
GRADE "A" (Open Hearth)
Vanadium . . . 35-40%
Silicon . . . . max. 12%
Carbon . . max. 3.50%
GRADE "B" (Crucible)
Vanadium . . . 35-45%
Silicon . . . max. 3.50%
Carbon . . max. 0.50%
GRADE "C" (Primos)
Vanadium . . . 35-45%
Silicon . . . max. 1.25%
Carbon . . max. 0.20%
HIGH V GRADES
Vanadium . . . 50-55%
60-65%
70-80%
Silicon . . . . . Low
Carbon . . . . . Low

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MAKERS OF FERRO-ALLOYS

VANCORAM

CHEMICALS AND METALS

(*Continued from page* 120)
continue to be part of the company's management in the capacities of a director and chairman of the executive committee. Mr. Smith, until recently, was engaged in industrial engineering consulting services as senior member of the New York firm of Smith & Wood Inc., until he joined De Laval in 1947 as assistant to the president.

♦ ♦ ♦

F. C. Prescott has been appointed assistant industrial relations manager, and **C. N. Hathway,** assistant labor relations manager, Caterpillar Tractor Co., Peoria, Ill. Mr. Prescott joined the company in 1937, following graduation from Boston University, and has worked in the metallurgical laboratory, personnel division and industrial relations department. Mr. Hathway enrolled in the machinist apprentice training course in 1935, and has since worked in the planning department, machine shop and labor relations department.

♦ ♦ ♦

Dr. Willard H. Dow, president, Dow Chemical Co., Midland, Mich., has been chosen by the American Society for Metals to receive the society's Medal for the Advancement of Research for 1948. Presentation will be made at the annual banquet of the ASM to be held in Philadelphia Oct. 28, during the National Metal Congress and Exposition.

♦ ♦ ♦

H. H. Reich, Trussville, Ala., has been appointed representative of the Shanafelt Mfg. Co., Canton, O., and will handle the line of flask pins, bushings and chaplets produced by that organization in conjunction with other foundry products which he has represented in the southern territory for many years.

Frank B. Rackley has been appointed general manager of sales, Jessop Steel Co., with headquarters at the general offices in Washington, Pa. He succeeds **T. W. Pennington,** former vice precident, who has resigned. Mr. Rackley attended University of Pittsburgh and spent the last 12 years with Carnegie-Illinois Steel Corp., Pittsburgh as a clerk, salesman, and more recently in charge of stainless steel sales for its western area, with headquarters in Chicago.

♦ ♦ ♦

Carl W. Volz has been elected a vice president of Electro Metallurgical Co., unit of Union Carbide & Carbon Corp., New York. Mr. Volz, who has been with the organization since 1913, is an officer and director of several other corporation subsidiaries.

(*Continued on page* 124)

AFS Chapter Chairmen Hold Conference

THE American Foundrymen's Society held its fifth annual chapter chairmen's conference June 28-30 at the Stevens Hotel, Chicago. E. W. Horlebein, vice president-elect of the society, was chairman of the conference.

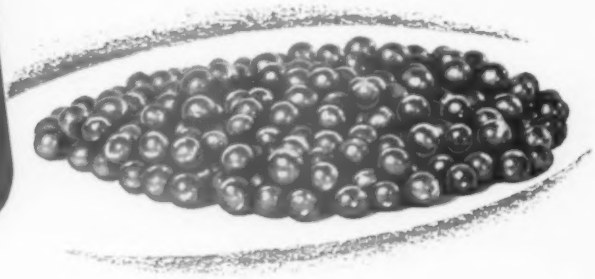
Sessions were devoted to the discussion of the various activities of the AFS, a detailed presentation of newly developed national office methods which will assist in the functioning of the chapter, and a study of the problems encountered in the operations of a chapter.

This year for the first time both the new chapter chairmen and the new vice chairmen were delegates to the conference. These men entered into the discussion with considerable interest, and created the feeling that the conference is an important activity in the successful operation of the chapter work of the society.

The accompanying illustrations show the chapter chairmen at the opening session of the conference, and the speakers' table at the dinner which followed the first day's meeting. The speaker at the dinner was Prof. E. A. McFaul, Northwestern University, who talked on "How's Your Sense of Humor?"

Rounded to Perfection!

Metal Blast "ANNEALSHOT" is more round more uniform



Offhand, most anyone would doubt that there could be much difference in shot. But foundrymen are finding out, by changing over to ANNEALSHOT, that there very definitely is a difference.

For one thing, ANNEALSHOT is more uniformly round and absolutely free of foreign material. This means you'll get a more uniformly beautiful finish with ANNEALSHOT, with less wear and tear on your equipment.

ANNEALSHOT is just what the name implies—annealed shot. It's annealed by a special process developed by METAL BLAST, which toughens the shot while retaining its hardness. Yet ANNEALSHOT is not brittle—it will not pulverize. You can count on 15% longer life—more efficient cleaning or peening—a better finish in less time—and still ANNEALSHOT costs no more than ordinary shot. Your first order will prove there's a difference! Mail it in today!

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ANNEALSHOT by Metal Blast

Trade Mark Reg. U. S. Pat. Off.

(*Continued from page* 122)

Leon Burnett has been appointed works manager, Bardes Forge & Foundry Co., Cincinnati.

♦ ♦ ♦

Leonard W. Rothe has entered the supervisory training program at Central Foundry Division of General Motors Corp., Danville, Ill. Mr. Rothe was graduated from the University of Cincinnati in June with a degree in metallurgical engineering, where he engaged in cooperative training with Armco Steel Corp., Butler, Pa., and Middletown, O.

A. W. Helebush and **William Greer** have been appointed distributors for the United States Electrical Tool Co., Cincinnati, in California, Arizona and Nevada, with headquarters in San Francisco. **H. D. Wixson** will cover the Michigan and Toledo, O., area, with headquarters in Detroit, and **William D. Shapiro** will handle the Metropolitan New York area.

♦ ♦ ♦

Dr. William M. Baldwin Jr., associated with Chase Brass & Copper Co., Cleveland, for a number of years, has been appointed research professor of metallurgy at Case Institute of Technology. Dr. Baldwin was graduated from Rensselaer Polytechnic Institute in 1936 with a degree in chemical engineering.

♦ ♦ ♦

Thomas S. Nichols, president and chief executive officer, Mathieson Chemical Corp., New York, has been elected to the additional post of chairman of the board of directors, succeeding the late George W. Dolan. **J. C. Leppart,** vice president, has been named to fill Mr. Dolan's place on the board, and has been appointed executive vice president.

♦ ♦ ♦

A. L. Hawk has been appointed assistant to the western district manager in Chicago, and **R. B. Hazard,** manager of distributor sales, western district, for Raybestos-Manhattan Inc., Manhattan Rubber Division, Passaic, N. J. Messrs. Hawk and Hazard have been associated with the company for many years.

♦ ♦ ♦

Henry B. Clark has been appointed New York branch manager of the Diamond Alkali Co., Cleveland, succeeding **Charles V. Douglas,** who has resigned. Mr. Clark has been branch manager of the company's Boston sales office since 1946. **Charles L. Flaccus Jr.** has been named assistant branch manager in New York.

♦ ♦ ♦

R. I. Parker has been elected a commercial vice president, General Electric Co., Schenectady, succeeding **W. O. Batchelder** who has retired following 43 years of service. Mr. Parker, who joined the company in 1912, will supervise customer relations in the west central area with headquarters in Chicago.

♦ ♦ ♦

Ralph H. Maxson, president of the St. Paul Foundry & Mfg. Co., St. Paul, has been elected chairman of the board of directors, W. L. Maxson Corp., New York engineers and manufacturers. Mr. Maxson has been a member of the board since the company was incorporated in 1935.

♦ ♦ ♦

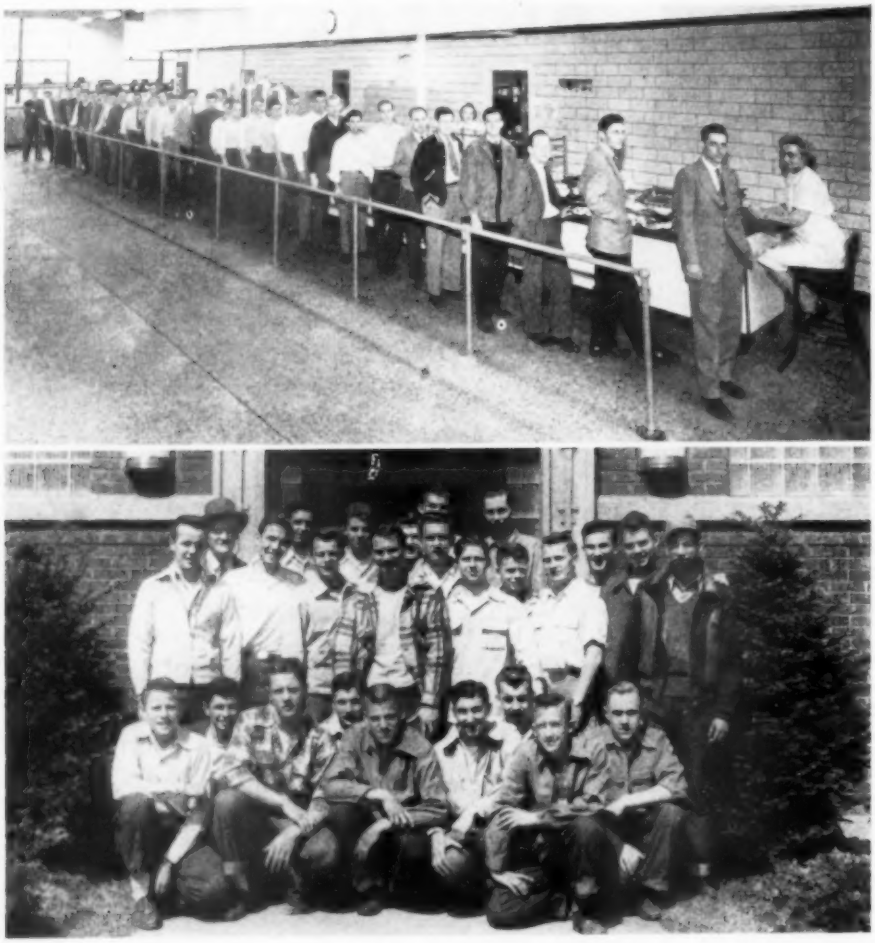
A. J. Mulvihill, president, Mulvihill Foundries Inc., Hannibal, Mo., has been made city manager of De-Soto, Mo. Mr. Mulvihill, former mayor of Hannibal, has been serving as a member of the city council there.

♦ ♦ ♦

Thomas W. O'Hara, works manager, Symington-Gould Corp., Depew, N. Y., has retired after 36 years of service. Mr. O'Hara will continue to serve in a consulting capacity. **D. P. Murphy,** vice president in charge

(*Concluded on page* 126)

Students and Apprentices Tour Modern Foundry



STUDENTS from various educational institutions recently visited Belle City Malleable Iron Co., Racine, Wis., for plant tours. Shown at top, are students from the extension division, University of Wisconsin, engineering school, Racine. Students studying mining and metallurgy at the University of Wisconsin, engineering school, Madison, Wis., also visited the foundry. They were accompanied by Richard W. Heine and Professor Rosenthal.

The industrial arts class and their instructor, C. H. Taylor, from the William Horlick High School was one of the groups who toured the plant. They are shown in the bottom view.

The Milwaukee Vocational School brought a total of 59 apprentices representing 24 different casting industries in Milwaukee through the plant in four separate visits.

In all cases the groups, after touring the plant with competent guides, were brought together with a company representative in the plant conference room for a discussion and question period. When these groups were in the plant near the lunch hour, the company invited the visitors to lunch in the cafeteria operated on the premises.

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TO LOWER PRODUCTION COSTS

14 ADVANTAGES "LUBRICATED FOR LIFE" BELT CONVEYOR IDLER

1. Only precision bearings are used.
2. Double seals on both sides of bearing.
3. Hex bore holds inner race from turning.
4. Hex axle (No. 1045 cold drawn steel) held free from turning in supporting frame.
5. No bearing adjustment—ever.
6. Easy to start and run in cold weather.
7. No intricate grease seals.
8. No inner tube to fill with grease.
9. No grease fittings or piping to 6 bearings.
10. No cost for grease or for its application.
11. Always presents a clean, free from grease, appearance.
12. Ball races rust proofed—metal parts of seals made of Stainless steel.
13. Turns easier—runs smoother.
14. **Maintenance cost is negligible.**

● Looking for a way to lower maintenance and unit costs while enjoying greater foundry productivity? Let Palmer-Bee show you ways to improve your present foundry conveyor system. Every Palmer-Bee conveyor installation features the use of the exclusive "Lubricated for Life" bearings—this means no more costly "down-time" attributable to lubricating and bearing replacement.

Take advantage of Palmer-Bee specialized experience in foundry conveyor layout. More than forty years of consulting conveyor engineering experience. Write today for complete information relative to your foundry problems.

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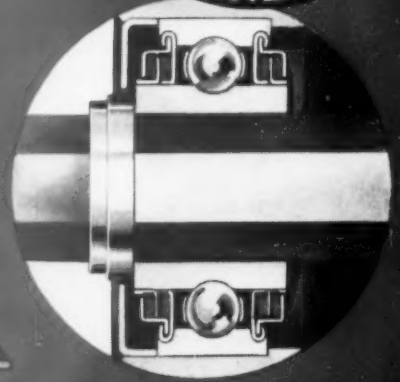


PALMER-BEE BELT CONVEYOR TROUGHING IDLER

(*Concluded from page* 124)

of operations, has assumed the additional responsibilities of works manager.

♦ ♦ ♦

Whitley B. Moore has been elected vice president in charge of sales, Timken Roller Bearing Co., Canton, O., succeeding **L. M. Klinedinst,** who has retired following 43 years of service with the company. Mr. Klinedinst will remain a director of the company and further serve as sales consultant

♦ ♦ ♦

E. J. Geittmann has joined the Carbonite Metal Corp., Burlington, Wis., as vice president and general manager. Mr. Geittmann was sales manager, Fisher Furnace Division of Lindberg Engineering Co., Chicago, for the last 6 years.

♦ ♦ ♦

George R. Brockway has been appointed sales manager of the Rapids-Standard Co. Inc., Grand Rapids, Mich. He joined the company in 1943 and previously was assistant sales manager and central regional sales manager.

♦ ♦ ♦

S. W. Fletcher, president of J. O. Ross Engineering Corp., New York, was honored at a company luncheon July 1, upon completion of 25 years with the organization. Employees presented him with a motion picture projector screen as a token of esteem.

♦ ♦ ♦

R. J. Steel and **D. Roll** acquired the Metalcast Co., Charlestown, Ind., from **Frank Ferguson,** Louisville, former owner. Mr. Steel was formerly plant superintendent of the company.

♦ ♦ ♦

Walter W. Moore, formerly superintendent of the Burnside Steel Foundry Co., Chicago, has been appointed works manager.

♦ ♦ ♦

Roger W. Jackson has been appointed east central district sales manager of the Chemical Department, General Electric Co., with headquarters in Cleveland. Mr. Jackson attended University of Rochester and spent 7 years with Standard Brands as manager of the Portland, Me., district. He joined General Electric Co. as a member of the sales training course at Pittsfield, Mass., in 1943, and was sales representative at Lynn, Mass., prior to being appointed district representative in the Pittsburgh office, three years ago.

♦ ♦ ♦

Robert C. Wayne has been appointed a member of the advertising department, Surface Combustion Corp., Toledo, O., and will specialize in industrial furnace sales promotion. He was formerly assistant to the technical and research director of the Steel Founders' Society of America, Cleveland, and previously was associated with the Naval Research Laboratory, Washington.

♦ ♦ ♦

John C. Haas has been elected a vice president of United States Radiator Corp., Detroit, in addition to his present position as secretary. Mr. Haas joined the corporation 38 years ago and was named production manager in 1946.

♦ ♦ ♦

William J. Taylor, formerly chief process metallurgist at South Works, Carnegie-Illinois Steel Corp., Chicago, has joined the sales department of Exothermic Alloys Sales & Service Inc., Chicago.

♦ ♦ ♦

David K. Colesberry has been appointed general sales manager of the Harrington & King Perforating Co., Chicago. For the last 22 years Mr. Colesberry was associated with the Sharples Corp., Philadelphia.

♦ ♦ ♦

Omer Fluherty has been appointed manager of Indianapolis Brass & Aluminum Foundry Inc., Indianapolis, succeeding **Don Moore,** who has resigned.

♦ ♦ ♦

E. E. Miller has been appointed foundry buyer, B. F. Avery & Sons Co., Louisville, succeeding **B. F. Newman,** who has been transferred to the accounting department.

♦ ♦ ♦

Louis Stevens has acquired Central Pattern Works, Indianapolis, from the B & B Foundry which closed there recently.

♦ ♦ ♦

Russel Dummich has been appointed superintendent of the pattern shop at the C & G Foundry & Pattern Works, Indianapolis.

Adds Department of Metallurgy

Establishment of a department of metallurgy at Stevens Institute of Technology, Hoboken, N. J., has been announced by Dr. Harvey N. Davis, president of the college. Housed in the new William H. Peirce Memorial Laboratory of Metallurgy, the new department will take over work in the metallurgical field formerly carried on by the department of chemistry. Dr. Alfred Bornemann, professor of metallurgy, will head the department.

Steel Founders Plan Conference

Steel Founders' Society of America will hold an industrial relations conference at the Sheraton Hotel, St. Louis, Sept. 23 and 24. A number of interesting technical sessions and social activities have been planned.

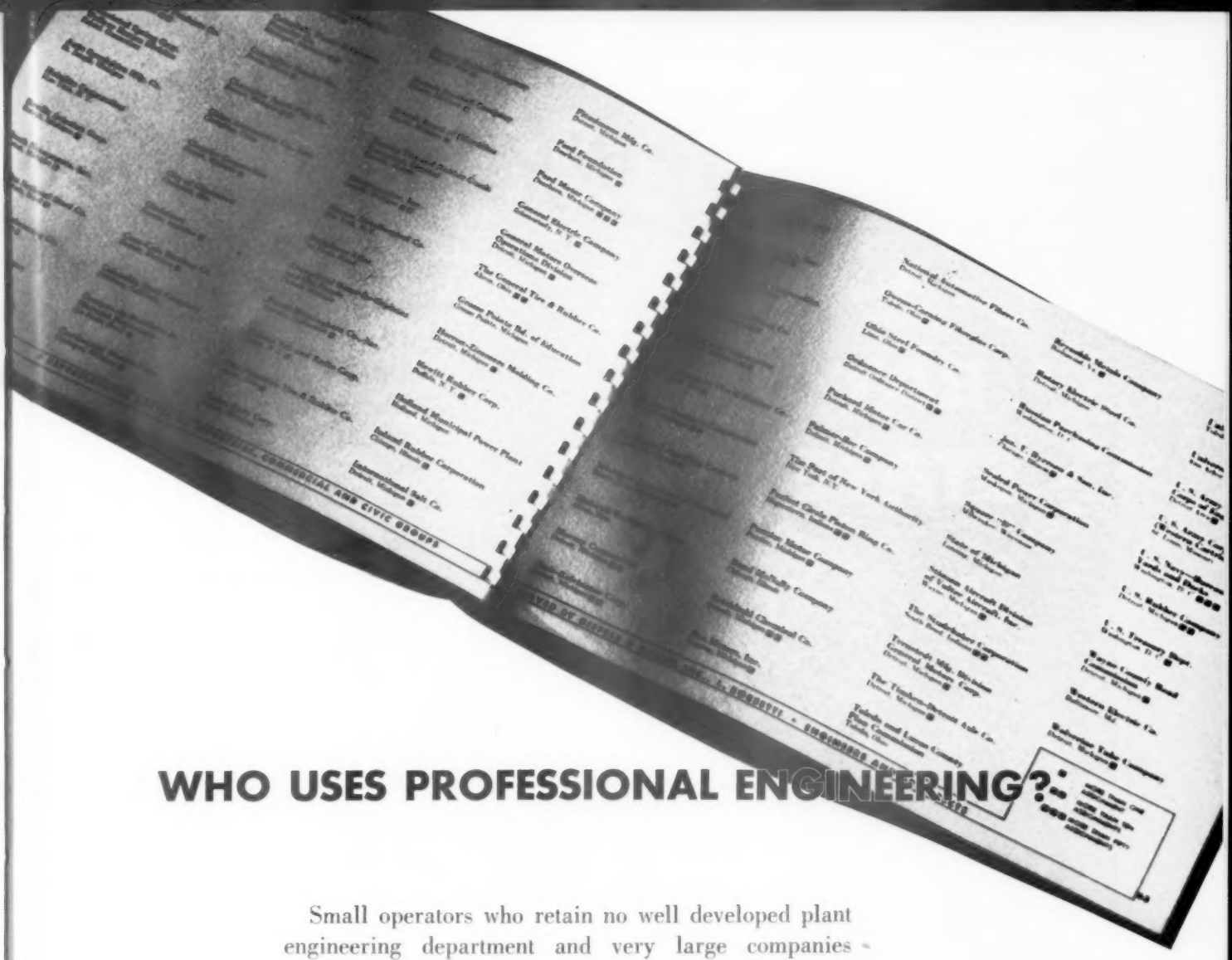
The tentative program follows:

Thursday, Sept. 23

9:00 a.m.—Registration
9:45 a.m.—Opening Session
Presiding: Harry L. Simmons, personnel director, Scullin Steel Co., St. Louis, and chairman of the society's personnel committee.
Introductory remarks by F. K. Donaldson, vice president and general manager, Machined Steel Casting Co., Alliance, O., and society president.
"Incentive Plans for Reducing Cost," by W. G. Woodhams, manager of industrial relations, Symington-Gould Corp., Depew, N.Y.
"Incentives for Indirect Workers," by C. E. Westover, Westover Engineers, Milwaukee.
"Profit Sharing for Better Production." Speaker to be selected.
Panel discussion. All speakers participating.
12:30 p.m.—Luncheon
Presiding: H. A. Forsberg, vice president, Continental Foundry & Machine Co., East Chicago, Ind.
"Employer-Employee Rights and Responsibilities Under the Taft-Hartley Act."
2:15 p.m.—Afternoon Session
Presiding: J. C. Breithaupt, personnel director, Dodge Steel Co., Philadelphia.
"The Major Importance of Industrial Relations," by Chauncey Belknap, Patterson Belknap & Webb, New York, and general counsel for the society.
"Wage Patterns and Wage Negotiations," by Ray Booth, executive secretary, Tri-State Association.
"Handling Fringe Problems," by E. J. Walsh, director of personnel, American Steel Foundries, Chicago.
Panel discussion. All speakers participating. Questions solicited in advance.
6:30 p.m.—Social Hour
7:30 p.m.—Dinner
Presiding: F. K. Donaldson, vice president and general manager, Machined Steel Casting Co., Alliance, O.
Nationally known speaker.

Friday, Sept. 24

9:45 a.m.—Morning Session
Presiding: T. F. Dorsey, vice president & general manager, Fort Pitt Steel Casting Division, Pittsburgh Steel Foundry Corp., McKeesport, Pa.
"Employee Pension Plans." Report of survey conducted by the society and presented by Leslie C. Thellemann, society executive vice president.
"The Requirements of a Sound Pension Plan," by J. H. Shreiner, vice president, Towers, Perrin, Forster & Crosby Inc., Philadelphia.
"Getting the Pension Plan Under Way," by W. P. Dudley, secretary and treasurer, Ohio Steel Foundry Co., Lima, O.
"Insurance, Hospitilization and Sick Benefits," by Elmer E. Ward, assistant treasurer, United Engineering & Foundry Co., Pittsburgh.
Panel discussion. All speakers participating.
12:30 p.m.—Luncheon
Presiding: G. Rhoads Casey, president and general manager, Treadwell Engineering Co., Easton, Pa.
"The Function of the Personnel Department," by R. S. Munson, vice president and general manager, Atlantic Steel Casting Co., Chester, Pa.
2:15 p.m.—Afternoon Session
Presiding: C. P. Caldwell, president, Caldwell Foundry & Machine Co., Birmingham.
"Community Relations—Getting People Interested in the Foundry," by E. O. Jones, personnel director, Racine Steel Castings Co., Racine, Wis.
"Telling Management's Story to the employee." R. S. Falk, assistant to the president, Falk Corp., Milwaukee.
"The Need for Training Programs," by C. J. Freund, president, American Society for Engineering Education, and dean of College of Engineering, University of Detroit.
"Top Management's Responsibility to the Line Supervisor," by Walter Moore, superintendent, Burnside Steel Casting Co., Chicago.
Panel discussion. All speakers participating.



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ELECTRIC OVEN ANNEALING OF MALLEABLE IRON

(*Continued from page 73*)

sis and to prevent excessive warpage, the maximum temperature in the first stage of anneal is set at 1720° F. The charges are put into the ovens for anneal at the time of day when out-plant demand is the lowest, being careful that two charges never start on cycle in the same period. The section size of our castings, which are largely made up of automotive work, averages from approximately ¼ to 2½ in., with an average weight of casting from 5 to 8 lb. By selective and careful packing, the weight of charge averages 14 to 18 tons per car. Normally, the charges are arranged to go into the ovens at times during the 24-hour period which will allow a minimum of labor ample time satisfactorily to load and unload successive charges.

Time Is Saved

The actual time saving in anneal with this equipment is accomplished in the initial heating up periods and the cooling periods from the first stage to the second stage of anneal, not to forget the time saved because of ability to control and maintain temperatures as desired.

All castings are packed without use of packing material. Small castings such as pipe unions, motor supports, spring pads, etc., are packed loose in baskets. Other small or medium size castings which, because of their design, tend to warp during anneal, are carefully packed in baskets in such a manner that one supports the other, thus allowing a minimum of warpage. Large castings, or castings which cannot because of their shape be satisfactorily supported in baskets, are carefully packed loose on top of the first layer of baskets in the oven. Castings which are particularly sensitive to warpage are placed on the brickwork or hearth of the oven below the supporting grids and between the grid posts. Castings most subject to thermal shock are also placed either on the hearth or near the center of the load.

It is essential that when placing the baskets and loose castings on the car (Fig. 6) the load be evenly distributed, being careful to place the baskets and castings within the confines of the grid area to avoid contact of the load with the oven brickwork or heating elements. A properly packed car is shown in Fig. 12.

Before placing the car in the oven, the sand seal (Fig. 10) around the base of the car must be carefully raked and the sand properly distributed in order that the sand will be clean of debris, thus assuring a tight seal.

The actual oven change (see Fig. 11) is manipulated in the following manner:

1. New charge is placed on track adjacent to high-temperature oven.
2. Car is lowered from low temperature oven and removed on the track to the area between the two banks of ovens (Fig. 3).
3. Car is lowered from high-temperature oven, moved on the track to a position directly below the low-temperature oven and is elevated into this oven.
4. New charge is positioned directly under the high temperature oven and is elevated into oven.

The entire change takes approximately 5 minutes during which time the charge being changed from the high to low temperature oven will lose close to 150° F of heat. Heat is applied to the high temperature charge and 10 to 12 hours later the charge will reach 1720° F. Immediately after the charge has been placed in the low-temperature oven, the blowers are turned on and the charge is cooled to 1400° F in about 6 to 8 hours, after which cooling of the low temperature charge is done at the rate of 2½°—5° per hour depending on the previously mentioned conditions. When the charge has been slow cooled to 1300° F, the blowers are turned on and the charge is rapidly cooled for the last hour of the cycle to 1250° F at which temperature the charge is removed.

The cars are cool enough to unload 3 to 4 hours following their removal from the oven. Unloading is done by means of a traveling crane either by magnet or hook. The baskets are inverted over buggies and the contents dumped (Fig. 1). The grids are placed back on the car and the baskets are rolled back to the packing area as needed.

The total cycle of anneal based on the foreging discussion is less than 60 hours.

Power Consumption — Full-load power consumption of each oven at unity power factor is 820 kwh, 1030 amps for the high-temperature oven, and 300 kwh, 377 amps for the low-temperature oven. Because of the unity power factor of the ovens, the plant power factor averages 90 to 95 per cent. The average power consumption of the ovens is about 375 kwh per ton, resulting in a low power cost per ton of castings annealed.

Labor Costs—The annealing department operates with a minimum of manpower. Packing and unloading is done on a tonnage rate of $1 per ton. The department operates and maintains all of its own instruments, and maintains all thermocouples, fuses, elements and brickwork for the ovens. Cost of control averages 50 cents per ton, maintenance cost 15 cents per ton.

Metallurgical Control — There are several distinct advantages in the metallurgical control of heat treatment with this type of annealing equipment. The most important advantage is the ability to operate and maintain the ovens at any desired temperature or through any desired range of temperature as in the case

Line Shot Blast Room With Rubber

INSTALLATION of an abrasion resisting rubber compound on the walls and ceiling of its shot blast room solved a tough maintenance problem for a New England manufacturer of textile machinery. Two inch wooden planking formerly lined the room, and under the punishment of shot from the hose against the rough castings, its ordinary life was about

one month. It then had to be replaced, and the room shut down until the maintenance job was completed.

Since the ¼-in. fabric backed rubber compound manufactured by B. F. Goodrich Co. was installed in May, 1947, there has been no maintenance problem and the installation shows no appreciable wear, according to the rubber company.

of cooling through the lower critical. The entire load is subjected to a uniform heat because of the air-tight seal and the proper distribution of the heating elements.

There is no need for supplying artificial atmosphere to the oven because the created CO and CO_2 gases during the graphitization period serve as a protective reducing atmosphere which minimizes decarburization and scaling of castings. Loss of carbon during anneal averages 0.15 to 0.20 per cent, leaving a scarcely perceptible rim on the casting.

During low-temperature treatment and because ovens are designed and controlled to cool at a given rate, the actual average critical point of the load can be observed on the recording instrument, this being at the point where the car temperature, due to exothermic heat of transformation, will show a definite lag behind the zone temperature. With this information it is a simple matter to set the limits of the temperature range through which the load must be given a slow cool to obtain complete and final graphitization.

The ovens adapt themselves very readily to the production of pearlitic malleable with or without use of alloys. This is done by adjusting the cooling rate through the lower critical and can be accomplished by two general methods, as follows:

1. By lowering the car out of the high-temperature oven when primary graphitization is completed and holding a desired time interval, thus giving the load an air quench before subsequent oven treatment of the load.

2. By making the oven change as usual and blowing down through the critical at a fast rate in the low-temperature oven, following by subsequent heat treatment.

Standard ASTM test bars representative of the load are placed at the center of the car next to the car thermocouple. One-inch square bars are placed in every other basket of the load in such a position that they may be taken off the car before it is unloaded. At the completion of the cycle and before the charge can be unloaded, the standard ASTM test bars are tested, and the square bars broken for fracture. Consistent control of the melting and heat treating processes leads to the steady production of ASTM Grade No. 35018 malleable iron.

Since the start of operations in 1944 the casting rejects due to poor anneal which could possibly be charged directly to faulty functioning of the furnaces has been less than five-hundredths of 1 per cent.

Read Core Oil–Sand Ratios From Chart

A volume to weight conversion chart for core sand mixtures recently has been developed by the Foundry Research Laboratory of the Werner G. Smith Co., 2191 West 110th St., Cleveland 2, for free distribution to the foundry industry. This chart enables foundrymen to tell very easily what oil-sand ratio he is getting on a weight basis, rather than a volume basis. The weight ratio is more accurate because volume measurements often are subject to errors caused by temperature variations or a dented or mis-shapen bucket. Weight ratios always are accurate and hence more economical in use.

CASTINGS DISPLAY: First of a series of displays in the Home Bank Co. window, St. Marys, O., showing products manufactured in that community, was that of St. Marys Foundry Co. The display featured gray iron castings typical of the work that foundry is doing. Established in 1917 when it took over the plant formerly occupied by the Buehler Foundry, St. Marys Foundry employed 26 persons. Today, 115 employees work two shifts in producing gray iron castings for a number of industries

CASTING ALUMINUM PISTONS IN PERMANENT MOLDS

(*Continued from page* 83)

three vertical sections. The center section is pulled down automatically when the mold halves are parted, and the outer sections of the core are linked to two levers on the front of the machine. When the operator moves these levers toward the center of the machine the outer core sections are pushed together and the casting may be lifted off the machine and placed on the conveyor belt. To prepare the mold for pouring another casting, the operator separates the outer halves of the core by pushing the levers toward the outside of the machine. A third lever is moved to actuate a valve which permits the hydraulic fluid to close the mold and bring the center section of the core into place.

The balance of the casting machines are located on the opposite side of the aisle in a similar manner although on a smaller scale. There are six bays of four casting machines, each bay being serviced by a 1250-lb capacity holding furnace. Another difference is in the fact that there is no conveyor to carry the castings away from the casting machines. Castings are dumped into hand trucks as they are removed from the machines and the trucks then are pushed to the inspection department.

The inspection department is divided into two sections. One section is located at the end of one aisle and the other is on the second aisle. Castings are visually inspected for defects, and the defective ones segregated and trucked to the scrap melting furnaces. Castings trucked into the department from the remaining casting machines are inspected in a similar manner.

Gates and risers are cut off some of the castings with a shear press located in this department. An abrasive wheel saw also is used for cutting off gates and risers, and castings are hand-trucked to this machine. Each cutoff machine is used to remove the gates and risers from

(*Concluded on page* 132)

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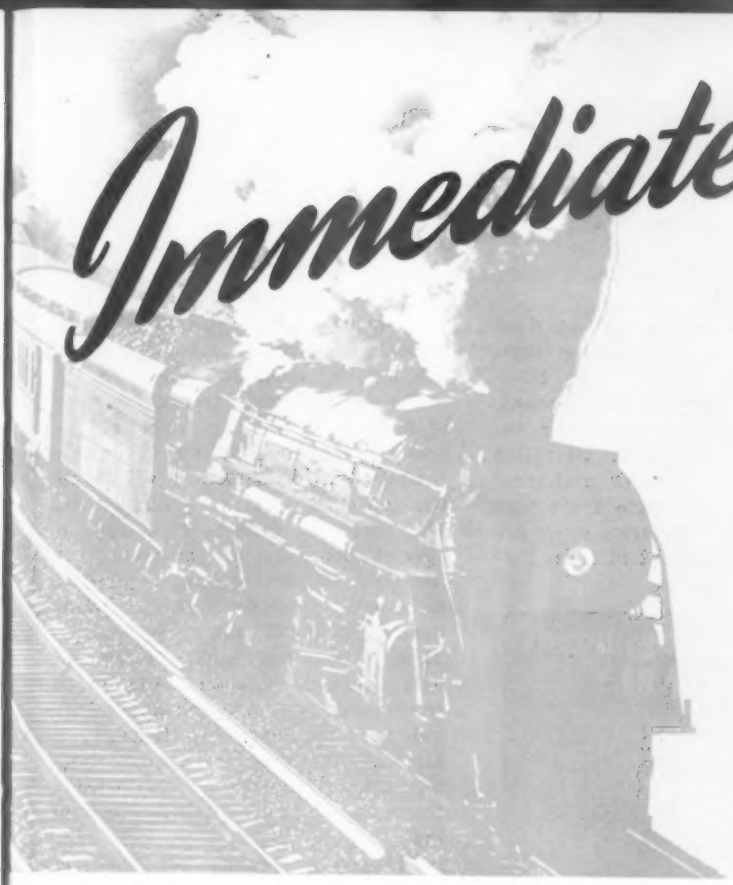

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Milwaukee 10" and 12" Jolt Squeezers and 12" Jolt Squeeze Pin Strippers are available today for immediate shipment. Because of our increased factory facilities and improved production techniques, we are able to speed delivery and, at the same time, maintain the highest standards of workmanship. You get high quality Milwaukee Molders, and get them faster. So write, wire or phone your order today. These dependable molding machines will be rolling your way . . . without delay.

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Milwaukee has developed a line of rugged molding machines, capable of producing accurate molds under constant hard usage. The squeeze head construction assures constant parallelism between jolt table and platen; the convenient location of control valves makes for ease of operation. The machine is designed to give utmost safety to the operator. All this makes possible the production of more and better molds, in less time, at lower cost.

MILWAUKEE JOLT SQUEEZE PIN STRIPPER
—No. 125, the "3 in 1" machine. Operates as a Pin Stripper, Pin Lift or Jolt Squeezer.

MILWAUKEE JOLT SQUEEZER PORTABLE TYPE
No. 124 equipped with knee operated jolt and vibrator valves, 12" squeezing piston, steel wheels and mold shelf.

MILWAUKEE JOLT SQUEEZER STATIONARY TYPE
No. 103 with 10" diameter squeeze piston. Exerts a squeezing pressure of 6,200 lbs. at 80 lbs. line pressure. Overall height 64".

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(*Concluded from page* 130)

pistons cast in different alloys. This is done in an effort to keep the scrap segregated for remelting.

Castings which have been heat treated with the gates and risers attached and which are to be shipped to the customer for machining, have the gates and risers removed at the saw. They are packed into boxes and pushed along roller conveyors toward the loading platform, where they are stacked until shipped.

The other inspection department is equipped with three electrically driven lathes. At least one piston from every casting machine is brought into the department each day and turned down on the lathes across the face of the piston, and part way down the side. Also a groove is cut into the side near the top of the piston skirt. The pistons then are visually inspected for porosity or other defects which can be traced back directly to the machine which made the casting and to the metal used in that machine. Weight of the pistons is checked also by turning down each style piston to a predetermined diameter, weighing it, and comparing that weight with a standard.

Scrap Is Segregated

Scrap from these inspection departments and the cutoff machines is all brought to the loading dock where it is segregated into the various alloys used in the foundry for remelting in one of the four scrap furnaces. These furnaces are gas-fired and melt at the rate of 120 lb per hr. Molten scrap of known alloy is carried directly from the remelting furnaces to the holding furnaces; miscellaneous and contaminated scrap is ingoted first and the content determined. It is then remelted and suitable additions made to produce the required alloy.

After the castings have been inspected, they are placed on wheel-mounted racks and wheeled the few feet to the aging ovens. Three gas-fired ovens are employed. The large oven is operated at 425° F and handles 15,000 pistons every 24 hrs, providing an 8-hr treating period for each piston. The oven is about 80 ft long and is raised off the floor about 10 ft. Castings are conveyed through the oven by an overhead chain which carries the castings on suspended racks of six shelves, each containing 12 pistons. Movement of the chain conveyor is extremely slow, being barely noticeable. Castings are loaded on the racks at the end of the oven nearest the inspection tables and are carried at floor level to the other end of the oven where the chain travels up into the oven and the castings begin the 8-hr treating cycle. The chain carrying the racks of castings descends from the oven at its mid point and by the time the castings reach the point where they were placed on the racks, they have cooled sufficiently to be unloaded by hand.

The other two ovens are at floor level and are much smaller than the overhead oven—each one holding about 4500 pistons. Four racks, loaded with castings from the inspection department, may be rolled into each oven. Pistons requiring a different treating cycle from that usually used in the large oven are treated here. Treatment in these furnaces generally is done over a 16-hr period at 390° F, although when circumstances demanded they have been used as supplementary units to the large heat treating oven.

Pistons are heat treated with or without gates and risers attached. The foundry prefers to remove the gates and risers first, but if the operators of the cutoff machines fall behind, pistons with gates and risers attached will be put into the ovens in order to keep the ovens full. All three of the ovens are operated continuously over a 24-hr period. After treatment in these ovens the pistons have a tensile strength of 30,000 psi.

Castings requiring greater tensile strength are treated in a solution furnace at 980° F for 3 to 8 hrs, depending upon the size. The castings are removed from the solution furnace and immediately quenched in a tank of water of the desired temperature and then are treated in the aging ovens for a short period to precipitate the alloy elements which were brought into solution in the solution heat treating oven and to obtain the desired strength characteristics. For castings requiring this additional strength alloy MS-96 listed in Table I is used. Passenger car pistons, which are treated only in the aging oven, are made from alloy MS-76.

After the gates and risers have been cut off and the pistons have been heat treated, they are loaded into hand trucks and wheeled to the loading dock for shipment.

The solution heat treating furnace is located in a room containing a small gas-fired melting furnace used mainly for experimental work, and the one-man sand core department. The coreroom man is kept busy on special jobs requiring sand cores. At the time of this writing sand cores were being made for a cast aluminum garbage disposal unit for attachment under a household sink. Other castings which have been made by the company include an aircraft centrifugal fuel booster pump housing, an aircraft fuel pressure regular housing which requires a steel core of ten parts, and an electric motor housing.

In another room the company maintains a rather large and complete machine shop where all the molds used in the foundry are made and repaired. Molds are kept in the best possible condition at all times and are brought into the machine shop at regular intervals for inspection and repair. Auxiliary molds are mounted on the casting machines when the regular mold is being inspected so that production of pistons is not interrupted.

In a combination sample storage and inspection room sample castings of each job done by the foundry are kept, and newly designed castings are checked here for dimensional accuracy before production runs are started. Inspections also are made on castings selected at random during production runs.

Buys Company

Milwaukee Foundry Equipment Co., 3238 West Pierce St., Milwaukee 4, recently was purchased by the Wright Machine Co., Worcester, Mass. Management, personnel and operation of the Milwaukee company will remain the same. C. H. Lungren is president and general manager.

Economic Co-operation Administion, Washington has published a booklet, "American Business and European Recovery," which outlines operations of ECA and the purchasing procedures of participating countries, listing addresses of foreign purchasing missions and embassies.

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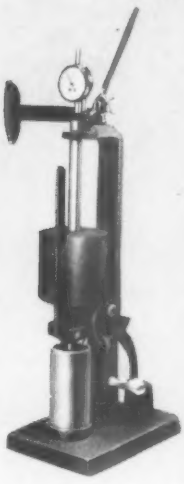
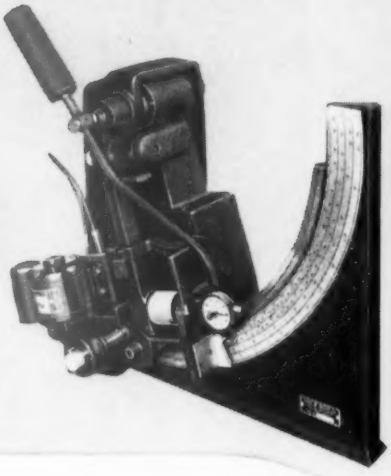
MOISTURE TELLER an instrument for either plant or laboratory which flash-dries sand samples for accurate moisture determination.

SAND RAMMER accurately reproduces the ramming of specimens to be tested for permeability, strength, density and flowability.



PERMMETER quickly and precisely determines the A.F.A. standard permeability of all molding materials. A direct reading unit.

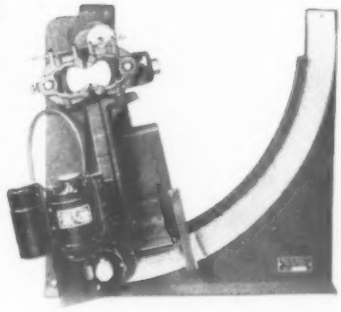
SAND STRENGTH MACHINE determines green or dry compression and shear strength of sand—also deformation to determine plastic strength. It is either indicating or recording.



CORES

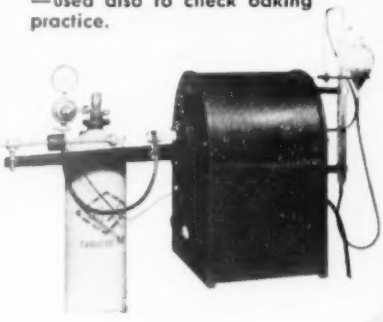
BAKING OVEN provides accurate control of core baking for core research and binder testing.

CORE PERMEABILITY TUBE is used with the Permmeter to determine the A.F.A. Permeability of baked cores and dried specimens.



TENSILE CORE STRENGTH ACCESSORY attached to the Sand Strength machine determines tensile strength of baked core specimens.

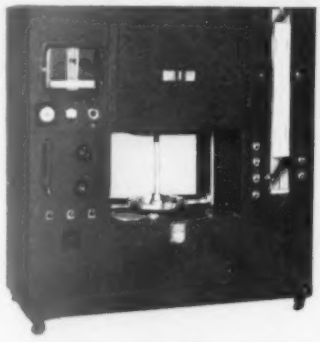
GAS DETERMINATOR measures volume of gas released by any core or molding sand mixture—used also to check baking practice.



MOLDS

MOLD HARDNESS TESTER determines hardness of green sand molds or green cores—also compressive strength of mold surface in psi.

CORE HARDNESS TESTER measures surface hardness of baked cores and dry sand molds.



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Man-to-Man

ON THE MOLDER'S BENCH

"Inside Selling"

By RALPH L. LEE

DURING a foundry talk session the other day a friend of mine was telling about an idea he had one time that literally saved the day for his company. No one who knows this fellow would ever accuse him of bragging or showing off. In fact he is just the opposite, rather close mouthed about anything he has ever done. But in this particular case his idea was so good on the face of it, and had turned out so well, that I felt he had every right to be proud and to come right out like a man and talk about it. He made me feel pretty good in knowing he considered me a close enough friend to tell something he wouldn't ordinarily talk about to others.

When he saw that I was going to be really interested in his story, he sort of backed up to the beginning for a fresh start so he could do the job up brown. He told me of the conditions which caused the problem that led him to think up the idea, and he mentioned the number of others who had taken a crack at it and flopped. He gave me the details of the mess the company was in as a result of the problem. But the high point of the whole story was when he tried to sell his idea to his boss. He confided in me that he had to do a bit of finagling behind the old man's back to finally make his point.

When the story was finished I couldn't help but think back over my many years of shop experience and discover that in nine cases out of ten the real villians in the personal accomplishment stories I had heard were not mechanical difficulties but the stubborn resistance of doubting Thomases in a position to block putting a good idea into effect. The heroes of course were those who won out against these great odds.

One of the most distinguished idea men I ever knew swears on a stack of bibles that the toughest and meanest mechanical problems on earth are lead pipe cinches compared with those resulting from stubborn, closed minded, unimaginative human barriers who block the road of progress. I've known this genius for many years and his batting average is so outstanding that he may well be listened to with profit by anyone. From my own personal viewpoint, being sort of an idea man myself, I must say it's quite comforting when I think of the ideas I failed to put over and feel I can lay the blame on the shoulders of the *no men* with whom I ran afoul.

Some Ideas Not So Good

On the other hand and between us girls, I've got to confess that I have without a doubt proposed some pretty screwy ideas which if they had been accepted, would have backfired on me with disastrous results.

I've had some experience in that most difficult of all positions of having to say yes or no. In looking back over it I've got to say, and in all honesty, that taking it day in and day out the number of ideas offered or suggestions made that show the earmarks of having something to them in comparison to those that are obviously on the wet side are pretty well down on the percentage scale. I have talked to other people with far more experience in this field and they invariably agree.

I know for a fact that most research laboratories consider a one to one hundred batting average on ideas and hunches pretty good, in fact good enough to justify them carrying on. People in other lines of work tell me this percentage isn't too far out of line. So it seems to me it isn't very surprising that those in the judgment seat with so much experience in saying no will, through habit once in a while, say no when they should have said yes. I feel pretty grateful that most of us do have someone protecting us from the results of going off half-cocked.

I've just about come to the conclusion that the resistance to new ideas is a darned good thing, and that recognizing resistance as being a darned good thing has got to be the very first step in getting any place in the idea business. All of us know that resistance, momentum, impedance or inertia trip you up at every turn in the field of mechanics so it isn't very surprising that this resistance thing slops over into the field of man to man relations.

We all know that salesmen on the outside drumming up trade had better take resistance for granted or go out of business. In fact if it weren't for resistance they wouldn't have a job. And speaking of salesmen, having had much to do with them in the past, I can't help but think what would happen to them if they tried to sell their stuff the way most of us try to sell our ideas in the shop. I'd be willing to bet that the door would be slammed in their faces so many times the first day they tried to sell their stuff the way we do our ideas they'd be out of a job by night.

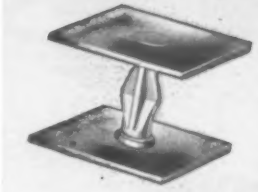
I think we have something here. In fact I know we have. I think we ought to do something about it and I think we can, for the files in most of our offices are cluttered up with good ideas so poorly presented and so miserably sold they lie dead in their filing cabinet coffins.

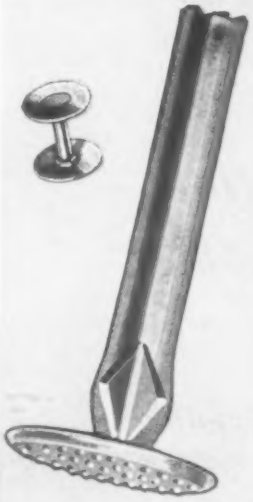
The first step in overcoming this waste, it seems to me, is a recognition on the part of the fellow who has an idea, or thinks he has, that no matter how good it seems to be to him, it's got to be bought by

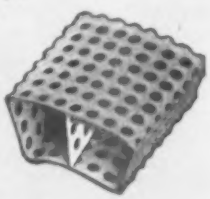
(*Concluded on page* 137)

For Sound Castings

FANNER CHAPLETS & CHILLS







To speed up production, reduce production costs and sharply cut down on "rejects"—follow the leaders who have found that using Fanner Chaplets and Chills is a "must" in good, economical foundry operation.

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in 12 different sizes

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fast sturdy machines—3 sizes

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4 sizes ranging up to 16" draw

JOLT, SQUEEZE, STRIPPING PLATE AND PATTERN DRAWS
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IMPROVED UP-TO-THE-MINUTE MOLDING MACHINES FOR EVERY NEED

(*Concluded from page* 134)

the person with the say so. And I say bought in every sense of the word. As we all know from experience we buy by parting with something we've got and want for something we don't have but want more than what we've got. The thing we buy has got to be a bargain, to us at least, or we simply won't make the deal. And one thing is certain, we won't buy a pig in a poke, whatever a poke is.

We might say that the buyer of ideas in a shop has two kinds of money to spend; first his company's money, and second his measly little peewee supply of time. The chances are the more freedom he has to buy, the less time he has to spend. He is usually in the market for any legitimate merchandise which can be proved to help him get his and the companys' work done, and at a price he can afford to pay in both time and money.

Seller Has Competition

The seller has loads of competition, in fact the woods are full of those gunning for the two kinds of money, but particularly for the scarcest of the two, the one hour bills together with the fifty, twenty-five, ten, five and penny minute coins.

Now here comes a young whippersnapper with an idea he wants bought. At least he thinks it's an idea. In many cases it really isn't an idea, its' just the seed of what may or may not turn out to be an idea. But whatever it is, he's got it and because *he* has it he feels toward it as a cackling hen must feel toward an egg she couldn't help laying anyway.

Whether his prospective buyer likes eggs or not, or whether he now has more on hand than he can use, the genius has just got to cackle, regardless of the time of day or even if the barn's on fire.

When I was a cub on the drafting board, I went off half cocked so many times I made a note in a little book I have to this day—*Frame your proposition before presenting it.* In those days I painted landscapes as a hobby, oil paintings. When I barely had one of them started and felt the old creative thrill of life along my keel, I got so excited with my own genius that I would nab the first person who came along and show him what I had already done long before there was enough of it for him to tell what the heck it was. Even when the start had been promising I found that those I showed it to got pretty well fed up with my line of chatter trying to explain what wasn't there and what a humdinger the picture was going to be when I got through doing this, that and the other thing.

I found that if I could keep my shirt on till I had the picture finished and then showed it, I made a much better impression and people didn't try to dodge me when they saw me coming. And if I could muster up enough patience to not only finish the picture but frame it as well, I found in some cases at least my picture went over better than a much better picture by someone else that wasn't framed.

In the light of all the years that have passed I see no reason for changing my mind one iota regarding this subject, even though I haven't yet quite cured myself of going off half cocked. We need all of the good ideas we can get in this good old foundry business, so it seems to me we've got to do everything we can to remove the foolish and unnecessary obstacles preventing us from getting those that lie around within reach. So here are some of the things that occur to me on the subject of inside selling.

Timing Is Important

1. Just because an idea is ours is no sign it's good. Maybe without our name on it, it might go over better to those who don't care much for us anyway.

2. The advantage of our idea over what is now being done without it has got to be great enough to not only pay for the time taken to buy it but also the cost of stopping the old and starting the new. Even then there has got to be some margin left over. In the light of this if the idea teeters on the fence we'd better chuck it and go get another one.

3. There's a time and a place for everything, even for good ideas. A good salesman won't wake up a rich prospect out of a sound sleep to sell him the best mattress ever made. If an idea is really good, it can stand to wait for quite some time, in fact the best idea in the world too far ahead of time is no better than just as good an idea too late. *Timing is the thing.*

4. The best salesmen use the fewest words and because these words have got to be few they are picked out way ahead of time with the same kind of painstaking care a girl uses in picking out her engagement ring.

5. A top notch salesman would rather demonstrate than talk. If a good idea can be pried loose from the imagination and put into solid, seeable and touchable form, it will speak for itself. If it can't, we had better drop it.

6. When he has done everything he can think of to sell a product, without being a pain in the neck, and the prospect still won't buy, the good salesman either gets another prospect or another product.

Of course when you get right down to it there is usually something wrong with an idea that's too darned hard to sell. But anyway, the foundry needs all the ideas it can get and I know for a fact that there are a lot lying around waiting to be sold.

Gray Iron Founders To Meet Oct. 14-15

Gray Iron Founders' Society will hold its 20th Annual Meeting at Haddon Hall, Atlantic City, N. J., Oct. 14-15. An informative business program has been arranged, and the entertainment committee has been planning events for those who attend.

The tentative business program follows:

Thursday, Oct. 14

8:30 a.m.—Registration
10:15 a.m.—Business Session
Remarks of society president: Howard A. Stockwell, Barbour Stockwell Co., Cambridge, Mass.
Reports of Committees: Henry J. Trenkamp, Ohio Foundry Co., Cleveland
Executive vice president: Raymond L. Collier
Technical and research director: Charles O. Burgess
Advertising Committee: E. C. Hoenicke, Easton Mfg. Co., Detroit
Cost Committee: A. E. Hageboeck, Frank Foundries Corp., Moline, Ill.
Technical Committee: E. B. Sherwin, Chicago Hardware Foundry Co., North Chicago, Ill.
Terms and Conditions of Sale Committee: P. E. Rentschler, Hamilton Foundry & Machine Co., Hamilton, O.
Foundry Education Foundation: J. M. Price, Ferro Machine & Foundry Co., Cleveland
12:30 p.m.—Industry Luncheon
Presentation of retiring board of directors
"Rating Better People in our Foundries," William B. Given, American Brake Shoe Co., New York
2:30 a.m.—Symposium on Foundry Hygiene
"Silicosis in the Foundry Industry," A. E. Hamlin, M.D., American Brake Shoe Co., Chicago
"Building Healthful Working Conditions into the Foundry," Theodore F. Hatch, Industrial Hygiene Foundation of America, Pittsburgh
"Legal Aspects of Compensating Disability Caused by Silicosis," Theodore C. Waters, Mullikin, Stockbridge & Waters, Baltimore
4:00 p.m.—Committee Meetings
5:30 p.m.—Social Hour

Friday, Oct. 15

9:00 a.m.—Registration
10:00 a.m.—Business Session
"Profit-Sharing and the Free Enterprise System," Robert S. Hartman, Council of Profit-Sharing Industries, Wooster, O.
"Security Must Be Earned," H. C. Nicholas, Quality Castings Co., Orrville, O.
"The Pig Iron Situation—Past and Present," John A. Claussen, Merchant Pig Iron Committee, American Iron & Steel Institute, New York
"Education Program for Foundry Personnel," James H. Smith, Central Foundry Division, General Motors Corp., Saginaw, Mich.
12:30 p.m.—Industry Luncheon
Introduction of new board of directors
Introduction of new officers
Presentation of citations and awards by H. A. Stockwell, society president. One mold medal and four awards in scroll form will be made.
Speaker: Harold Hoffman, former governor of New Jersey
Adjournment

eyes that stopped the thermometer at 1250°f

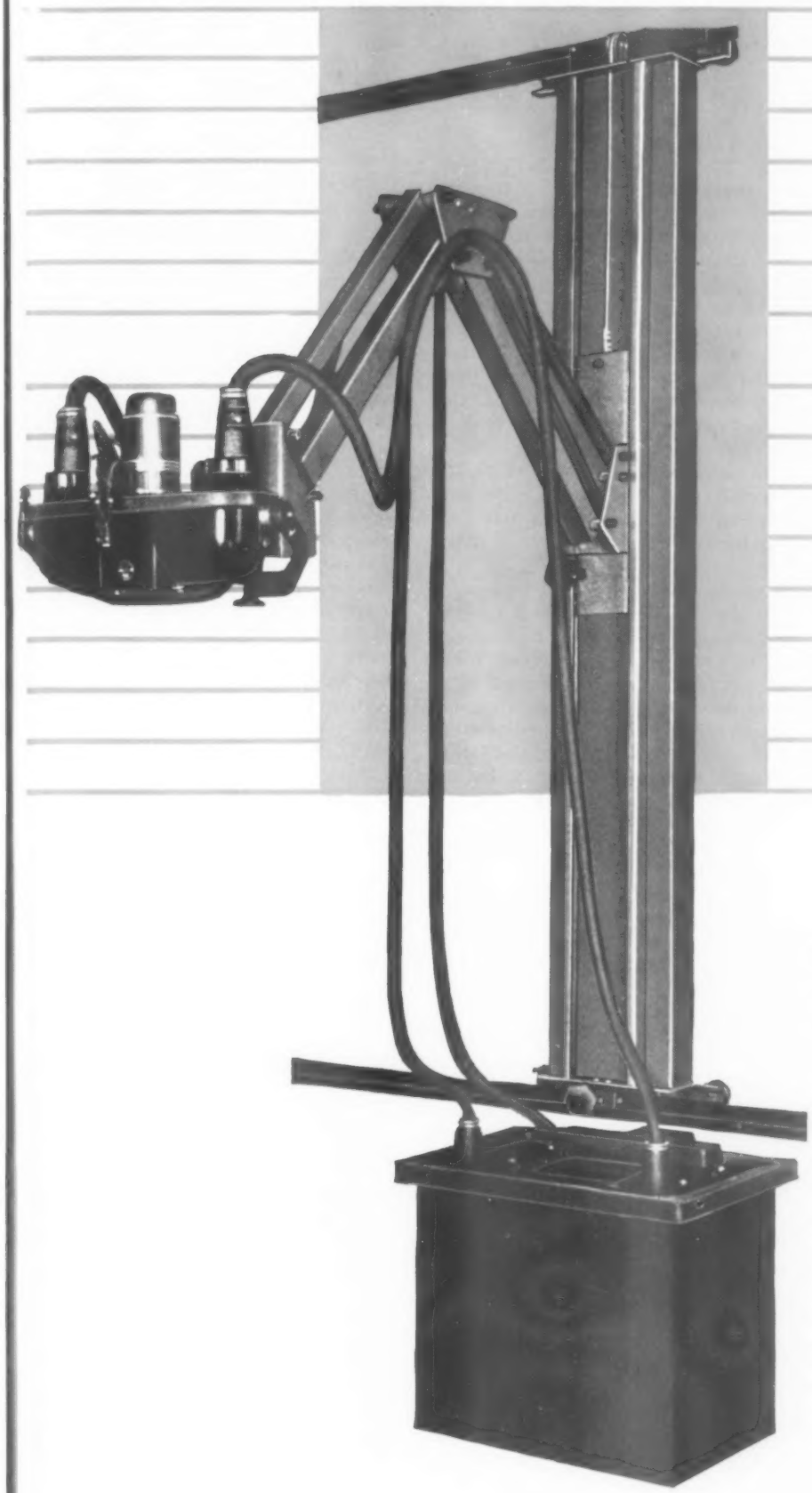
THE castings *looked* good. But machining told a story of irregularities. For every 100 castings delivered by the foundry, 45 came back "REJECTED." Costs skyrocketed. Shipping schedules bogged down.

What was wrong? The chief metallurgist thought he knew: enlarged grain size and porosity caused by imperfect pouring temperatures. But how prove it to management? And how find the perfect temperature?

Experimental melts were poured at 1250°, 1350°, 1450° and 1550° F — and the castings then checked by the foundry's General Electric Industrial X-Ray unit. On three of the films, a peppering of dark spots. Only the melt poured at 1250° showed a uniformly fine grain.

The radiographs were convincing. Management set a standard pouring temperature — 1250° F. Rejections dropped to less than 15 per cent. Monthly acceptances grew by 200,000 pounds. The General Electric Industrial X-Ray unit almost paid for itself on the first job.

In its ability to locate defects, develop better techniques, improve designs, General Electric Industrial X-Ray is an indispensable part of plant equipment. There's a good chance that industrial x-ray can be used profitably in your business. Why not talk it over with a General Electric X-Ray engineer? Write or wire. General Electric X-Ray Corporation, Dept. I-37, 4855 McGeoch Ave., Milwaukee 14, Wisc.



Industrial x-ray is not new. Industry already is better off by millions of dollars because of it. But many of its applications are new—and the product of General Electric X-Ray Corporation's pioneering and leadership.

Spectacular recent development is the General Electric million-volt industrial x-ray unit (not illustrated). It probes welds and castings up to 7 inches thick, trims inspection time by as much as 99%.

There are other G-E industrial units for light metal castings, packaged goods and small assemblies; each specially fitted to specific industrial needs.

And, additionally, there's analysis by *diffraction* in which the composition and characteristics of materials can be studied from patterns—rather than images—produced on films by diffracted x-radiation. Savings to industry with this equipment alone mount up to millions of dollars.

GENERAL ELECTRIC X-RAY CORPORATION

• General Electric X-Ray Corporation manufactures and distributes x-ray apparatus for industrial, dental and medical use; electromedical apparatus; x-ray and electromedical supplies and accessories.

AROUND Detroit

By A. H. ALLEN
Detroit Editor
THE FOUNDRY

General Motors takes step toward Kettering-type engine . . . Other manufacturers retool for new models . . . Pig iron outlook continues to be poor

AT LEAST two new V-8 valve-in-head engines are sure shots for 1949 General Motors models—Cadillac and Oldsmobile. Both appear to be of the same basic type, with higher compression ratio, smaller bore and reduced overall dimensions, representing the first step toward the ultimate Kettering-type engine with 12.5 to 1 compression ratio as described before the S.A.E. convention last summer. Initially, a jump will be made to an 8.5 to 1 compression ratio, since this is about as far as designers can go on the basis of present premium fuels. When 100-octane gasoline becomes a commercial reality—and oil companies are moving ahead with their cat-crackers and other equipment needed to produce such fuels—these new engines can be revised without too much expense to achieve the economies possible with the high-compression ratio.

Oldsmobile and Cadillac have been the bellwethers on many innovations in mechanical and style changes for the General Motors family, and appear to be embarking independently on the new engine projects, despite their basic similarity. Olds has organized what it calls its Kettering Engine division and has purchased many new and elaborate types of machine tools for processing engine details. Some are already installed and operating and it is expected the finished product will be ready for assembly lines by late fall or earlier, to be available only on the larger or 98 series model.

Central Foundry Division of General Motors, with plants at Defiance, O., and Danville, Ill., will furnish most of the basic castings for the Olds engine. Output has been under way for some weeks at Danville, and iron was scheduled to be poured for the first time at Defiance around Aug. 23. When originally mapped out the Defiance gray iron foundry was to be the source for castings involved in the Chevrolet light car, and after the latter was put aside the Defiance project marked time for a number of months. With the advent of the new Olds engine, not readily acommodated at the Pontiac, Buick or Chevrolet foundries, Central Foundry Division proved the logical spot, so a rush call went out to get the Defiance operation going. John Doerfner Jr., brother of W. A. Doerfner, now head of GM's Saginaw Steering Gear Division and a former foundryman himself, is plant manager.

Cadillac will produce its own castings for the V-8 valve-in-head job and closed a portion of its foundry for two weeks during August to set up new lines and equipment. The plant only recently underwent a complete rearrangement and modernization. Among other things, the latest changes will involve installation of jolt molding machines on the new engine line. Initial production of castings was due the week of Aug. 23.

Needs Raw Materials

In view of the expanding gray iron foundry capacity, General Motors divisions have been faced with the need for aditional raw materials, specifically, coke and pig iron. The foundry coke situation has eased appreciably following conclusion of a contract with the St. Paul, Minn., division of Koppers Co. for a large share of the output of the 65-oven battery there. These units formerly produced domestic coke and now have been switched to foundry grades which are shipped to Chevrolet, Buick and Pontiac foundries in Michigan, and probably will also find their way to the Central Foundry Division plants. Delivered price of the fuel is about $5 per ton higher than regular sources and quality reportedly is good. Chevrolet Gray Iron at Saginaw is continuing to receive regular shipments of coke from a Waukegan, Ill., producer, recently acquired by GM.

Outlook for pig iron is not so good, particularly in view of the suspension of shipments from one merchant furnace which went down unexpectedly for repairs. The Packard foundry has been importing iron from Holland and Belgium, paying a stiff premium in freight and finding quality none too good. A Cleveland foundry has imported a tonnage of iron and is selling some of this to other foundries in the district.

Long idleness of Campbell, Wyant & Cannon foundries in Muskegon, strikebound since June 14, naturally has worked to the benefit of other melters, although it has proved disastrous to companies depending on C-W-C for camshafts, crankshafts, blocks and other components. Ford truck and tractor plants, Lincoln-Mercury, Hudson, Willys-Overland, to name a few, were forced to curtail or suspend production because castings inventories had been exhausted. It was expected a couple of weeks would elapse even after settlement of the C-W-C walkout before these units could resume. Chrysler production was crippled in August because of a strike at New Haven Foundry Co., important source for cylinder blocks.

Nash production at Kenosha and Racine, Wis., plants was terminated at the end of July for a complete model change, and many of the 12,000 employed there were kept on the job to aid in relocating equipment, installing new machinery and getting pilot lines rolling. First assemblies are scheduled early this month and will be shown to dealer groups prior to public announcement in October. Both the 600 and Ambassador models have been given a thorough regrooming, with wider and lower bodies accompanying a score of mechanical improvements. Gray iron foundry at Kenosha was one of the first departments to launch production of 1949 components.

Kaiser-Frazer is announcing restyled models for 1949, the Frazer now being in production and the Kaiser to come along directly. A sharper differentiation will be made between the two makes, although basically they continue almost identical.

A $75 million retooling program is drawing to a close in Chrysler plants in preparation for its next series of passenger car models and concerted effort is being made to overlap 1949 and 1948 model production so that assemblies of the former can come hard on the heels of the last of the 1948s along about year-end. Already equipment changes are being made in Plymouth, Dodge, De-

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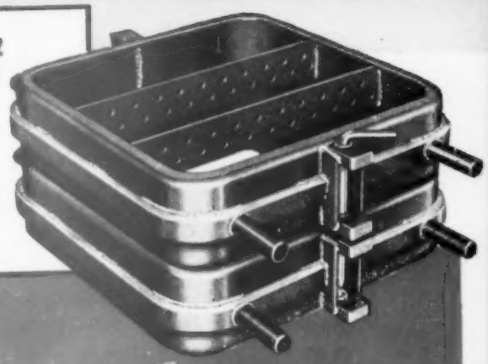

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M. W. Warren Coke Co.

TORONTO, CAN.
Canadian Foundry Sup. & Equip., Ltd.

(*Concluded from page* 140)

Soto and Chrysler manufacturing plants so that those subassemblies can be started.

Nov. 15 is the date on which a bead is being drawn by most of the General Motors divisions for first assemblies of 1949 models. Buick is in good position to effect a rapid change. Completely new bodies are in store for Buick, the smaller Oldsmobile, Pontiac and Chevrolet, and they will pretty much follow the pattern established by Cadillac and the Olds Futuramic this year. Lowness, wideness, improved visibility, curved windshields, reduced overall length are common goals.

Ford is struggling to boost production totals on its three passenger car lines, meeting continual delays and interruptions to orderly flow of materials and parts. The new 1600-ton blast furnace at the Ford Rouge plant is being pushed to completion and will appreciably reinforce supplies of foundry iron when it goes into blast, around Nov. 1. Construction work has been right on schedule, the contract providing a bonus for completion on time. Ore bridge and unloader equipment will not be ready until next spring, but this will not interfere with bringing the new furnace in blast early as anticipated.

Another rush plant job in this area is the new Ferguson tractor assembly unit, slated for production this fall. Engines for the Ferguson unit will be furnished by Continental Motors, with Lakey Foundry & Machine Co. and Wilson Foundry & Machine Co. being casting sources.

A new gray iron plant, scheduled to produce a general line of castings, is being built at Sturgis, Mich., under direction of two former International Harvester foundry managers, Harry L. Sprecken and W. A. Anderson, and is expected to be in operation shortly.

Lists Foundries Held By War Assets

With six months more to go before it reaches its termination date next Feb. 28, the War Assets Administration, dollar-wise, has disposed of about 87.5 per cent of the iron and steel plant inventory which the government had built with public funds during World War II. Of the 151 properties in the program, 52 remain to be sold. Of these 52 plants, 30 have been taken over by their wartime operators on long-term leases, and are in production. Of the other 22, most are idle, although several are being operated under so called "interim leases".

Foundries still in the possession of the government, identified by the names of the wartime operators, briefly are described as follows:

Albion Malleable Iron Co., Albion, Mich., malleable foundry and machine shop facilities, now under lease to this company.

American Steel Foundries Co., Hamilton, O., steel armor casting plant, not now in operation.

Atlantic Steel Castings Co., Crum Lynne, Pa., steel foundry, under interim lease to that company.

Auto Specialties Mfg. Co., Benton Harbor, Mich., steel foundry, under interim lease to that company.

Buffalo Brake Beam Co., Buffalo, carbon and alloy steel and malleable foundry and hot-dip galvanizing facilities, not now in operation.

Columbia Steel Co., Pittburg, Calif., open-hearth and electric steel foundry, now under interim lease to that company.

Continental Foundry & Machine Co., two steel foundries at Coraopolis, Pa., and East Chicago, Ind., neither in operation.

Crucible Steel Castings Co., Milwaukee, electric steel foundry, now under lease to that company.

General Metals Co., Oakland, Calif., steel foundry, now under lease to that company.

Hercules Mfg. Co., Centerville, Ia., steel foundry, now under lease to that company.

Jessup Steel Co., Washington, Pa., electric furnace plant for producing high-speed tool steel, propeller blade steel, etc., now under lease to that company.

Key Co., East St. Louis, Ill., steel foundry, not in operation.

Lehigh Foundries Inc., Easton, Pa., steel foundry, now under lease to that company.

National Erie Corp., Erie, Pa., steel foundry, now under interim lease to that company.

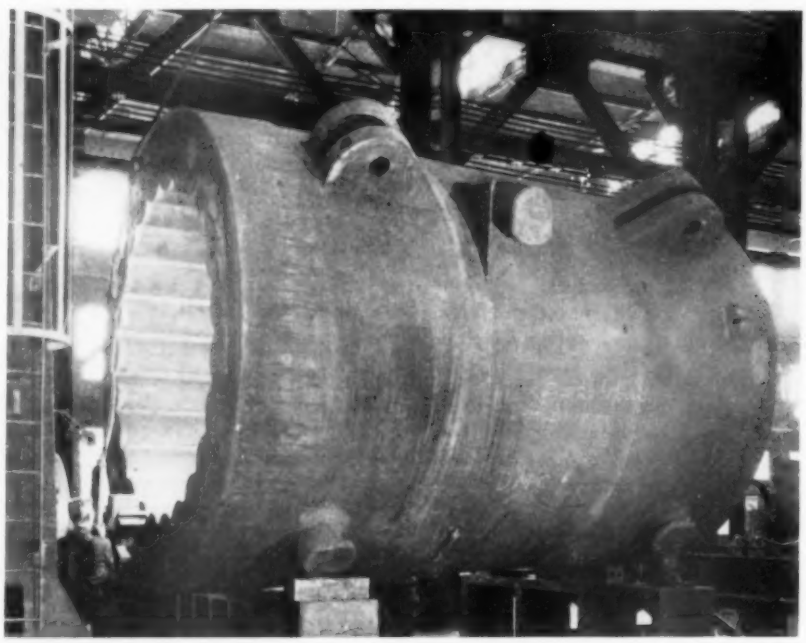
Ohio Steel Foundry Co., Lima, O., two steel foundries, one now under lease to that company and the other not in operation.

Pacific Car & Foundry Co., Renton, Wash., steel casting testing equipment, not now in use.

Scullin Steel Co., St. Louis, two steel foundries, part of one now under lease to that company and remainder of the facilities not in operation.

Unicast Corp., Toledo, O., steel foundry, now under lease to that company.

United Engineering & Foundry Co., New Castle, Pa., steel foundry, now under lease to that company.



INGOT MOLD: Cast iron ingot mold for 108-in. corrugated ingots is shown being machined at Bethlehem Steel Co., Bethlehem, Pa. Ingots poured in molds of this type weigh 465,000 lb and are among the largest ever handled. They are used in forging pressure vessels, generator parts and such pieces as the huge members for the two 2000-ton cyclotron magnets recently made at Bethlehem. In casting the mold, 450,000 lb of pig iron were used. It took nearly four weeks to cool the mold before it could be stripped. After stripping and cleaning it weighed 360,000 lb

Geared for action—on Timken® bearings

WITH low speed shaft and intermediate shaft mounted on Timken bearings, Philadelphia speed reducers give long, trouble-free service under the toughest loads and conditions. Shafts are held in rigid alignment; gears mesh with constant precision, minimizing wear.

Timken bearings are tapered in construction—carry any combination of radial and thrust loads without deflection or end-play. They're manufactured to incredible precision, finished to amazing smoothness. They permit closures to effectively retain lubricant and keep dust and dirt out.

The line of contact between rolls and races provides maximum load capacity in minimum space. And since they're made of the finest alloy steel ever developed for tapered roller bearings—Timken fine alloy steel—Timken bearings normally last the life of the machine.

Remember, no other bearing can bring you *all* the advantages you get with Timken bearings—backed by 49 years of bearing research and development. That's why it's so important to make sure you have Timken bearings in every machine you manufacture or buy. Look for the trade-mark "Timken" on the bearing. The Timken Roller Bearing Company, Canton 6, Ohio.

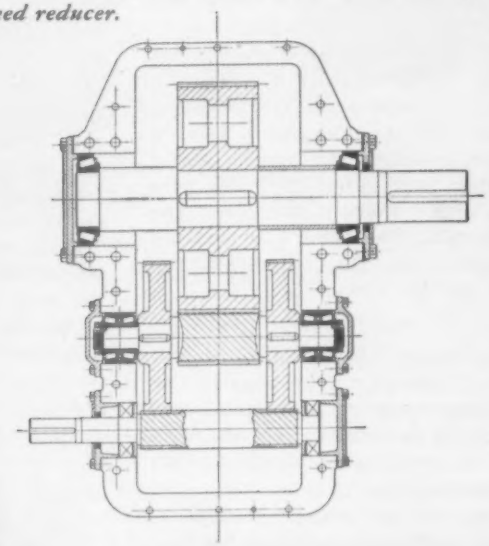
TIMKEN BEARING EQUIPPED

This symbol on a product means its bearings are the best.

Here's how

PHILADELPHIA GEAR WORKS, INC.

uses Timken bearings on the low speed shaft and intermediate shaft of their double reduction herringbone speed reducer.



WE MAKE OUR OWN STEEL

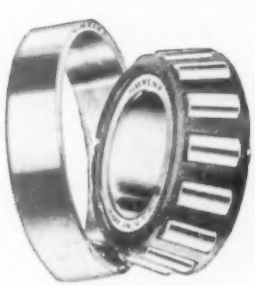
The special grade alloy steel which gives Timken bearings their strength and resistance to wear, is made in our own steel mills. It's the sure way to positively assure uniformly high quality.

The Timken Company is the only bearing manufacturer which makes its own steel, and leads in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ▯ AND THRUST ▯ LOADS OR ANY COMBINATION

FOUNDRY Developments

By EDWIN BREMER

AMONG the industrial applications of atomic energy recently disclosed is a device for determining the level of molten metal in a cupola. A radioactive isotope produced in the Oak Ridge thermal reactor, is mounted on a vertical slide rail alongside the cuploa, on the opposite side of which a similar slide rail carries a Geiger-Muller counter. As the radioactive source and the counter are moved up and down simultaneously the intensity of gamma radiation reaching the counter varies according to whether the rays pass through the molten metal or the gas above it. The point at which the radiation count changes indicates the height of the surface level.

• • •

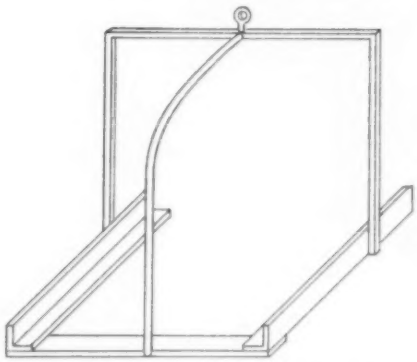
PROBABLY the most extensive use ever made of conveyor systems in the foundry industry has been adopted by a recent modernized New England plant. In addition to electric trains for transporting molds, belts for handling sand and monorails for moving hot metal, four different types of conveyor cars are employed to move cores, castings and return scrap. Operation of the system is largely automatic.

• • •

COMPARATIVELY new material for the woodworking industry which should be of interest to patternmakers is densified wood. Produced by impregnating veneers with phenolic resin and laminating them under heat and pressure, the material also is called compreg, derived from the words compressed and impregnated. It is claimed to be harder than any solid wood, and lighter than most solid metals (sp gr 1.35). Resistant to water, chemical attack, abrasion, scuffing and temperature extremes, and can be machined with modified woodworking equipment. Machining will not destroy its beautiful finish and high gloss which is integral throughout the material's construction and can be restored by buffing.

• • •

TO ASSIST machine operators in setting molds out on the floor one foundry employs the lifting device shown in the accompaying sketch. Easily fabricated from steel angles and rods, it is suspended from a power hoist which travels over a monorail extending from the molding station out over the floor. Base of the frame is wide enough so that it slips easily under the mold bottom board. The curved bar permits the frame to be inserted the correct amount for the mold to be balanced when lifted. It also is used to move the frame and hoist when loaded or empty. This device is employed only for the heavier molds, but it saves considerable manual effort, particularly when it is necessary to set out a long line of molds.



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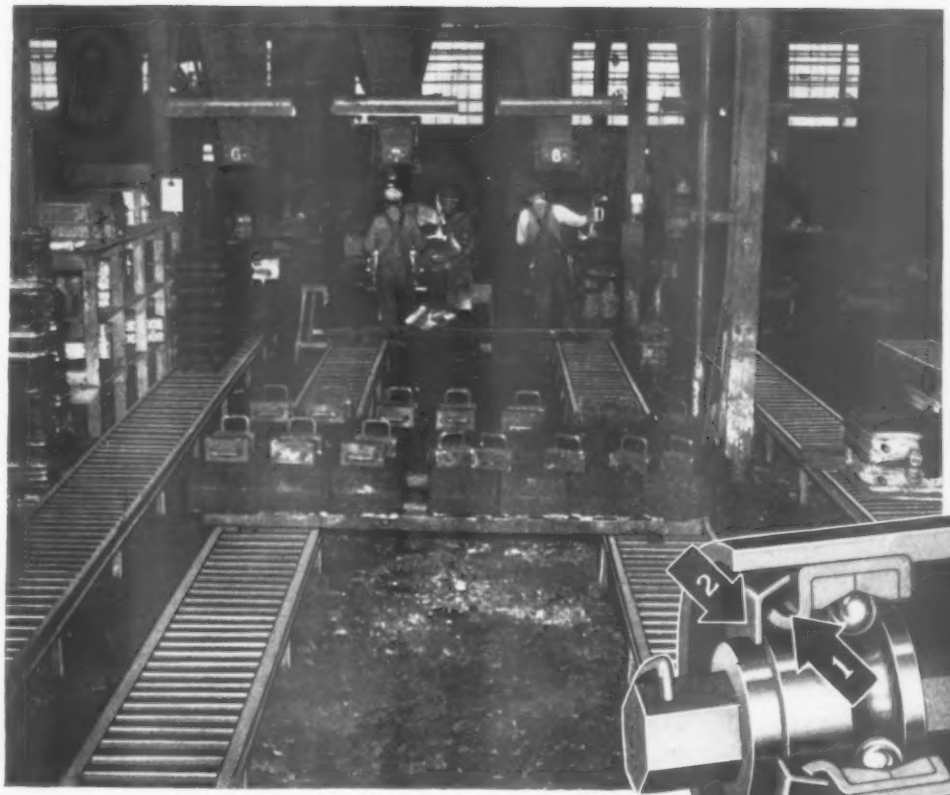
ON THE basis of a limited number of tests on ladle refractory nozzles for steel pouring R. B. Snow and J. A. Shea, United States Steel Corp., found that with fine-grain, aluminum-killed steel the amount of erosion decreases as the pyrometric cone equivalent increases while with rimming steel or higher-manganese, coarse-grain steels the amount of erosion increases as the PCE increases. According to the authors, whose data were presented at the recent meeting of the American Ceramic Society, the nozzle erosion and failure of higher PCE nozzles when teeming rimming steels and higher-manganese, coarse-grain steels is believed due to the presence of open pores in the more refractory nozzles. The pores permit the FeO and MnO-bearing liquid at the steel-refractory interface to penetrate into the body of the nozzle and to soften the nozzle to a depth of as much as 0.10-in. beneath the surface of the bore.

• • •

NEW constant voltage power supply for use in certain electrolytic determination and separation processes has been developed by the Electronic Instrumentation Laboratory, National Bureau of Standards, Washington. The device, operating from a 110-v, ac line, supplies a stabilized and continuously adjustable dc voltage at current demands up to 2 amp or more. Regulation is maintained with respect to a reference potential electrode. Instrument utilizes standard radio-type components, and contains an amplitude-controlled oscillator, a power amplifier and rectifier, and two direct coupled stages of amplification. Oscillator of multivibrator type operates at approximately 2000 cycles per second, producing a variable amplitude square wave which is amplified by a pair of audio beam power tubes in push-pull. These in turn are coupled through step-down transformer to the low-voltage, high-current rectifier. An inductance and capacitance filter reduces ripple and noise to a very low value. Filtered voltage is output of the instrument.

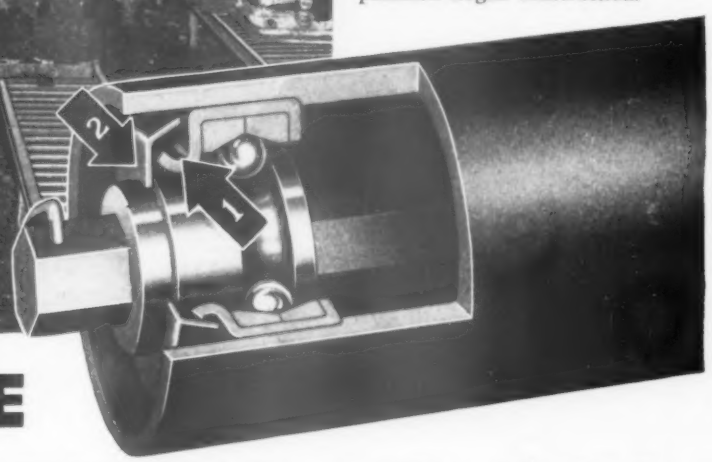
• • •

CONFORMITY in use of words or terms particularly with reference to exact application or by definition eliminates any possibility of misunderstanding. As a step in this direction a discussion at a meeting of ASTM Advisory Committee of A-1 on Steel led to the adoption of term "mechanical" properties for what previously had been designated "physical" properties. It was pointed out that the term "physical" covered all branches connoted by the term "physics"—matters involving magnetic properties, heat transmission, coefficient of thermal expansions, etc. Also it was decided to abandon use of the term "melt", and substitute the term "heat" in steel specifications.



LOGAN DUST-PROTECTED BEARING

Recommended for use where dust, sand, iron filings, or scale are present. Note the steel labyrinth seal (1), design of which tends to make it self-cleaning, i.e. dust which may drift in is thrown out as the roll revolves. The entire bearing assembly is set back from the end of the roll, in protected position. This non-lubricated bearing revolves just as freely as a plain bearing because it has no felt washers. Outer shield (2), which is fixed to the stationary inner race of bearing, does not touch any rotating part. The Dust-Protected Bearing is a patented Logan construction.



WHAT'S THE PRACTICAL THING TO DO?

. . . that is the $64 question on every production problem.

LOGAN PRESSURE LUBRICATED BEARING

- All-steel seals, bearing revolves as freely as a plain bearing because it has no felt washers.
- Bearing in protected position—set back from end of roll.
- The inner floating cup (patented) has a hexagon hole which snugly fits the shaft and prevents entry of grease into interior of roll.
- The outer (dust) shield is fixed to the stationary inner race—does not touch any rotating part.

In the selection of bearings for foundry roller conveyors there is an "ideal" solution, but there is also a practical solution which is more desirable both in performance and cost.

The "ideal" construction is the Logan Pressure Lubricated bearing (see the features listed at left). This is the last word in a pressure lubricated bearing . . . fresh grease is delivered under pressure to rear of bearing and any dirt or grit which may have worked into bearing through neglect is forced back out as old grease is replaced. But there is one big disadvantage to any lubricated construction, to wit: Regular lubrication is a time-consuming job, and neglect to lubricate is the usual result. Such a condition leads to the accumulation of dust and grit in the old grease, forming an actual grinding compound, thus causing rapid deterioration of the bearing. The same is true of grease packed bearings which have no provision for regreasing.

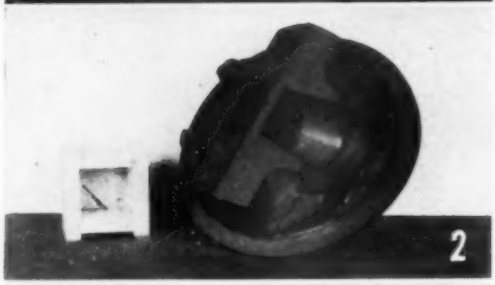
THEREFORE LOGAN RECOMMENDS in most cases the Logan Dust Protected bearing, a bearing which is run dry, not lubricated (see illustration above). In the last 10 years there has been a steady trend to this very practical bearing and away from lubricated constructions. Literature and further information on request.

Logan Conveyors

LOGAN CO., INC., 580 CABEL STREET, LOUISVILLE 6, KENTUCKY

Metal Cope and Drag Patterns—

By ROY A. LODER
Chief Inspector
Erie Malleable Iron Co.
Erie, Pa.



NUMEROUS types of patterns are used in the foundry industry and various methods have been employed in making such patterns. The method of making metal cope and drag patterns described here has been developed by the writer and Luke Beinke of the Plaster Process Casting Corp., Cleveland, to whom credit is due for his co-operation.

The usual method of making metal cope and drag patterns for a gear housing such as used on trucks, busses and automobiles, or other parts of similar shape or size, is to make a split wood master pattern representing the cope and drag patterns, or a solid pattern where the split pattern is not feasible, and employ lighter coreboxes for making cores which are used to lighten out the cast metal pattern, giving it the desired wall thickness and ribbing for supporting the pattern and the necessary rigidity. Views of a pattern and lightener corebox are shown in Figs. 1 and 2.

Metal coreboxes are produced from a master corebox which is made by making a dummy core of wood or other material over which plaster is poured; then the plaster is cut down to form the outside of the box and give it the desired metal thickness and lightness when cast. After the plaster box has been cut down, the necessary outside ribbing is added to give the metal box rigidity and support while cores are being made.

The smaller core prints for oil reservoirs, bearings and ribbing are built into the master box, after which it is ready for casting. In handling the plaster master corebox and in making the mold for the metal working box great care must be used, since plaster is easily broken. A plaster master corebox of this type is shown in Fig. 3.

The method developed recently for making metal cope and drag patterns of gear housing, etc. (which are normally molded in flasks up to 30 x 30 in. although this method could be applied to larger patterns if the plaster casters could handle them) and by which much time can be saved is as follows:

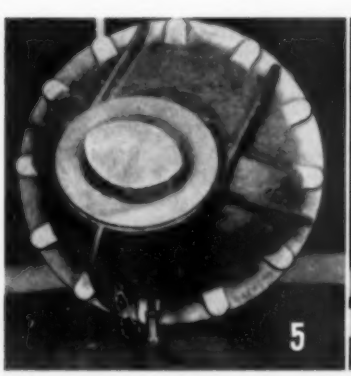
The wood master pattern is made in the usual manner except where a split pattern is not feasible, as in the case illustrated. Instead of making a cope and drag section, the pattern is made solid, which makes for easy handling in making and checking. No lightener corebox is made in either case because in making the metal pattern the plaster casters do their own lightening and make the metal pattern wall of the desired thickness. A view of a master pattern of a gear housing made solid is shown in Fig. 4 while Figs. 5 and

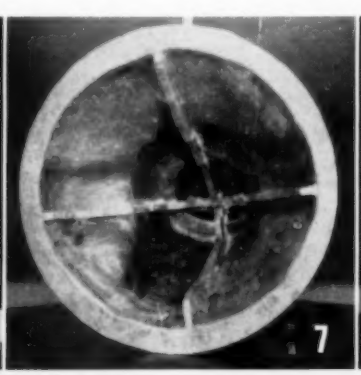
(*Concluded on page* 148)

Fig. 1—Master pattern for automotive gear housing. Fig. 2—Corebox to form lightening cores in producing shell-type metal pattern

Fig. 3—Master corebox made in plaster. Fig. 4—Solid master pattern for gear housing

Figs. 5 and 6—Outside or working faces of cast metal patterns. Figs. 7 and 8—Reverse or undersides of Figs. 5 and 6 showing ribbing to provide rigidity





THE Redford CORE BLOWER

CARTRIDGE BENCH TYPE

Users report remarkable increases in quality and quantity of production

When making cores from horizontally split boxes, the work of placing driers and drawing the box is done on the base of the machine

HUNDREDS OF FOUNDRIES ALL OVER THE WORLD ARE USING **REDFORDS** AS AN EFFICIENT LOW COST MEANS OF PRODUCING SMALL INTRICATE CORES

WRITE FOR

complete details and new booklet.

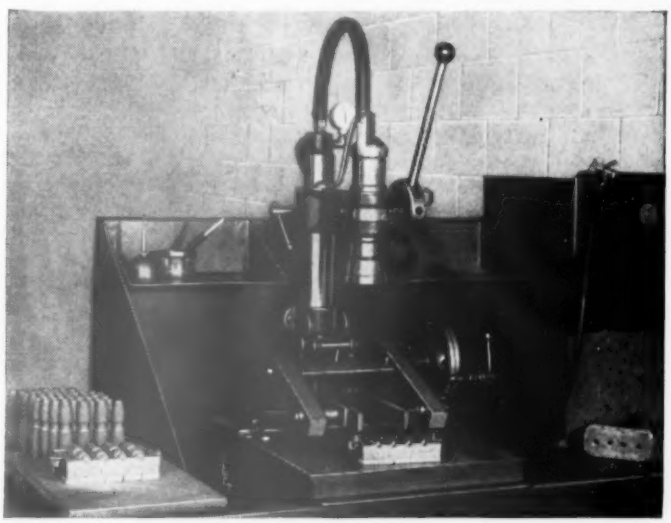
FILLS NEED FOR SIMPLE, FLEXIBLE CORE BLOWER

The Redford Core Blower has been accepted by cost-conscious foundrymen everywhere because it supplies an important need in the foundry for an efficient, low-cost method of blowing small, intricate cores. It requires no large volume of air and readily lends itself to handling a variety of core boxes. In fact, they tell us that it is the ideal method of making cores in single or gang boxes requiring a maximum of 2 lbs. of sand.

SAND CARTRIDGES AVAILABLE IN 12 STANDARD SIZES

Blower comes complete, ready to use. Each blower provided with one Size "C" sand cartridge which is adaptable to a large range of core boxes. Cartridges are available in 11 additional standard sizes and special sizes furnished where needed.

WE HAVE THE "KNOW HOW" AND WILL ASSIST YOU IN SOLVING YOUR CORE BLOWING PROBLEMS



The new air operated core box clamping attachment is used for the blowing of cores in vertically split boxes. Permits clear working space on machine base—simple to install, operate and adjust—can be swung to one side to clear base for blowing horizontally split core boxes.

Redford IRON & EQUIPMENT CO.

PHONE: REDFORD 8611

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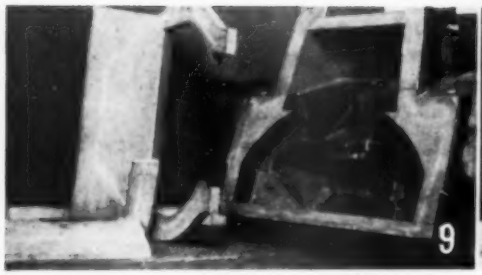

Figs. 9 and 10—Views of master wood box and frame to show desired shape of box face

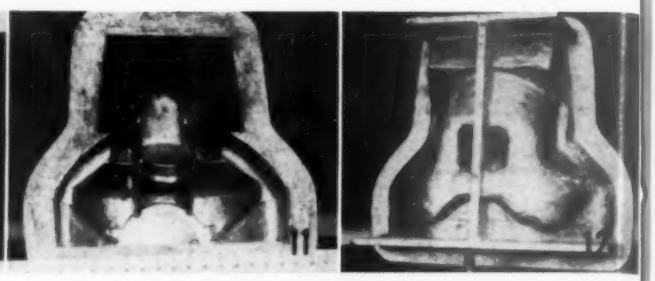

Fig. 11—Inside and shape of face of metal box. Fig. 12—Back or underside of box with ribbing

(*Concluded from page* 146)

6 show the outside or working faces of the cast metal patterns.

It will be noticed that two separate parts have been cast and Figs. 7 and 8 show the reverse or under sides, or backs. Notice how these are lightened out and ribbed.

The master corebox constructed for the new method is made in the same manner as a woodworking corebox. Here much time is saved as it is not necessary to lighten the outside of the box to form the wall thickness or ribbing. The only thing that is required is to provide a frame representing the desired shape of the face of the box and the necessary ribbing, the lightening up and making the wall the desired thickness being taken care of in the plaster casting.

Views of the master wood box and frame which were provided is shown in Figs. 9 and 10. Note the heavy construction of the box. Fig. 11 shows the inside and shape of the face of the cast metal box while Fig. 12 shows the back as lightened up and the ribbing.

OPEN-HEARTH FURNACE OPERATORS DISCUSS

Use of Oxygen at Record Breaking Conference

By EDWIN BREMER
Metallurgical Editor
THE FOUNDRY

ATTENDANCE records at the thirty-first conference of the National Open Hearth Steel Committee and the Blast Furnace, Coke Oven and Raw Materials Committee of the American Institute of Mining and Metallurgical Engineers, were broken with 1000 registered for the open hearth and 314 for the blast furnace groups. Conference was held at Hotel William Penn, Pittsburgh. Announcement was made that the 1949 conference will be held at the Palmer House, Chicago, on April 18, 19 and 20. C. R. FonDersmith, Armco Steel Corp., Middletown, O., was elected chairman of the executive board of the National Open Hearth Committee. Over 1000 were present at the annual fellowship dinner at which Joseph Carter, Pittsburgh Steel Co., Pittsburgh, was toastmaster, and Charles E. Wilson, General Motors Co., Detroit, was the speaker.

Considerable attention was devoted to the discussion of application of oxygen and compressed air in the production of steel. Use of oxygen is most effective in reducing the carbon content down to 0.08 to 0.06 per cent after which considerably more oxygen is consumed per point of carbon reduction. With good control on rate of oxygen input into the furnace, no trouble is encountered from splashing except with the roof. While increased production is obtained by increasing the flow of oxygen, splashing is increased with subsequent reduction in the life of the furnace. Hence, a compromise must be made, and a suitable rate of oxygen input to reduce the carbon 1½ points (0.015 per cent) per minute has been found satisfactory.

One speaker stated that excellent results were obtained with a double burner using oil and compressed air or oxygen. High production was obtained due to the fact that the flame enrichment produced high temperatures. However, no great difference could be observed between use of oxygen or compressed air as the enriching agent. Another stated that results from use of oxygen indicated that 12,400 cu ft of oxygen was equal to use of 4000 lb of ore in carbon elimination. Heat time decreased with use of oxygen as compared to use of ore. No direct improvement in quality of steel was observed, and desiliconization of blast furnace metal in the ladle with oxygen did not give good results.

At another session on basic foundry practice it was pointed out that with the use of 8000 cu ft of oxygen per hour in the burner, 115 heats showed a reduction of 1 hour per heat. Use of oxygen jet gave a 25 per cent reduction of the refining period. One speaker stated that where sufficient oxygen was not available for carbon reduction, a 15 minute use of oxygen provided an extra temperature kick to start the lime boil. In another application employment of oxygen at the rate of 550 cu ft per minute, producing a carbon drop of 1 to 1½ points per minute, provided a gain of 1 to 1½ hr per heat.

Use of preheated compressed air for atomization resulted in cutting the heat time 1 hr, according to another speaker. Air was preheated to 385° F and the oil to 150° F. In still another case it was stated that use of preheated air for atomization in the burner provided a saving of 13 per cent in time; no ore being used.

In a report of information obtained from a number of plants employing cold metal practice in basic open-hearth furnaces it was indicated that fuel oil has a wide range of sulphur content, and that all grades and shipments should be analyzed for sulphur. Likewise wide variations in sulphur content exist in lime, dolomite and fluorspar; No. 2 melt scrap and cast iron also are high in sulphur, and to keep sulphur content in the bath low, less of those materials should be charged.

Sulphur content at meltdown falls between 0.15 to 0.02 per cent with

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It saves up to $36 daily

The BELL Prime Mover

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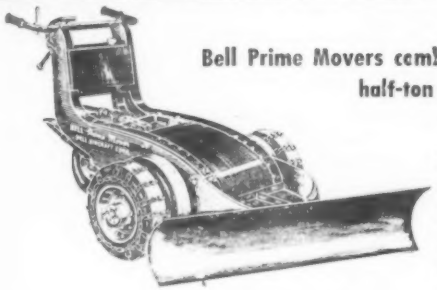

Bell Prime Movers combine the functions of giant wheelbarrows, half-ton platform trucks, and baby bulldozers . . . enable one man to do the work of four.

Here are just a few examples of how Bell Prime Movers pay for themselves in an amazingly short time. If other companies can make these savings, so can *your* company...

A Pennsylvania foundry reports saving 3 to 4 man-days per machine each day using Prime Movers to distribute core and facing sand; to handle residue from cleaning of cupola; for pouring concrete foundry floor. This is at least $36 daily in direct labor savings.

A New York State stainless-steel foundry reports using its Prime Mover for distributing approximately 20 tons of sand each day. One elderly man now does the job. This Prime Mover was purchased in November. By the end of January it had paid for itself in direct labor savings on this job alone.

Hundreds of other users report equally remarkable daily savings for each machine. If you would like some of these facts . . . as well as other important data about the Prime Mover . . . please write to us. We also can give you the names of nearby distributors who sell and service this machine.

A Few Features

- bucket holds 10 cubic feet . . . 18 with sideboards
- 50-inch scraper blade
- 9-square-foot platform body
- gear driven . . . no belts or chains
- clutch, engine, transmission fully enclosed . . . run in oil

A PRODUCT OF

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Please send me additional facts about the Bell Prime Mover.

Name..... *Address*.....

Company.....

City, Zone, and State.....

(*Concluded from page 148*)

50 per cent of the plants reporting in the range 0.050 to 0.025 per cent. Average of the group omitting a single high value was 0.020 per cent. Average of all plants on slag-metal weight ratio was 1 to 8.5 or a slag weight of 11.5 per cent of the weight of metal. Results from some plants showing an MnO content in the slag from 5.6 to 11.5 per cent before addition of ferromanganese or spiegel, indicated that high MnO and high residual Mn in the steel have a favorable effect on sulphur elimination.

Results of survey emphasizes that sulphur control is a relative problem, and steelmaking practice adequate for producing ingots of 0.05 per cent sulphur specifications would be inadequate for deep-drawing rimmed steel of 0.035 per cent sulphur specifications. Likewise castings with thin intricate sections probably would require lower sulphur than those of massive design.

Report concluded that sulphur has the following effect: It is an active inclusion former and the higher the sulphur content the greater the number of inclusions that are formed. Chain types of inclusion, type II, produced when critical amounts of aluminum are added as deoxidizers, produce low ductility properties in cast steels, especially as the sulphur content increases above 0.025 per cent. Increasing sulphur content lowers room-temperature notched bar values regardless of the type of inclusions, though type II inclusions produce the greater effect.

Increasing sulphur content appears to increase resistance to grain growth, both with and without aluminum additions. Sulphur decreases strength and ductility of cast steel at temperatures between 2200 and 2500° F and produces a steel more susceptible to hot tear formation. Improper inclusions of the sulphide type make a steel more susceptible to hot tear formation. Hence, the sulphur content of steel should be maintained as low as possible to minimize any harmful effects.

Czechs Scheduling Foundry Congress

The Czechoslovak Foundry Technical Association is sponsoring an international Foundry Congress to be held in Prague, Sept. 15 to 19. Heading the committee in charge is F. Pisek, professor of foundry engineering, Institute of Technology in Brno, with L. Jenicek of the Mining and Metallurgical Institute serving as secretary.

Meeting Calendar

Sept. 23-24—Steel Founders' Society of America, industrial relations conference, Hotel Sheraton, St. Louis

Sept. 23-24-25—National Association of Foremen, 25th anniversary meeting, Philadelphia

Sept. 24—Malleable Founders' Society, industry meeting, Hotel Cleveland, Cleveland

Sept. 30-Oct. 1—All Canadian Conference of Eastern Canada and Newfoundland AFS Chapter, Windsor Hotel, Montreal

Oct. 1-2—Michigan Regional Foundry Conference, Michigan State College, East Lansing, Mich.

Oct. 12-16—American Chemical Society, Chicago Section, Fifth National Chemical Exposition, Chicago Coliseum, Chicago

Oct. 13-14—Magnesium Association, midyear meeting, Skytop Club, Skytop, Pa.

Oct. 14-15—Gray Iron Founders' Society, annual meeting, Haddon Hall, Atlantic City, N. J.

Oct. 14-15-16—Foundry Equipment Manufacturers Association, annual meeting, Greenbrier, White Sulphur Springs, W. Va.

Oct. 15-16—New England Foundrymen's Association, annual regional conference, Boston

Oct. 18-22—National Safety Council, congress exposition, Chicago

Oct. 22—Nonferrous Founders' Society, annual meeting, Philadelphia

Oct. 22—Malleable Founders' Society, western sectional meeting, Palmer House, Chicago

Oct. 25-29—National Metal Congress and Exposition, Philadelphia

Nov. 4-5—Metals Casting Conference, Purdue University, West Lafayette, Ind.

Nov. 5—Malleable Founders' Society, eastern sectional meeting, New York

Nov. 11-13—Meehanite Casting Manufacturers, annual meeting, Pittsburgh

Nov. 15-16—Steel Founders' Society of America, fall meeting, Hot Springs, Va.

Nov. 18-19—National Founders' Association, annual meeting, Sheraton Hotel, Chicago

Nov. 19—Malleable Founders' Society, western sectional meeting, Palmer House, Chicago

Dec. 2-4—American Institute of Mining and Metallurgical Engineers, Electric Furnace Steel Committee, annual conference, Hotel William Penn, Pittsburgh

1949

Jan. 14—Malleable Founders' Society, semiannual meeting, Hotel Cleveland, Cleveland

Feb. 9-10—Steel Founders' Society of America, annual meeting, Chicago

Feb. 10-11—Regional Conference, Wisconsin Chapters of AFS, Milwaukee (Tentative)

Feb. 17-19—Regional Conference, Birmingham Chapter of AFS, Birmingham

Feb. 25—Malleable Founders' Society, western sectional meeting, Palmer House, Chicago

Feb. 28-Mar. 4—American Society for Testing Materials, committee week, Edgewater Beach Hotel, Chicago

Mar. 4—Malleable Founders' Society, eastern sectional meeting, New York

Mar. 11-12—Ohio Regional Conference, sponsored by Ohio AFS Chapters, Columbus, O.

Mar. 25—Malleable Founders' Society, western sectional meeting, Palmer House, Chicago

Apr. 18-20—American Institute of Mining and Metallurgical Engineers, National Open Hearth Steel Committee annual meeting, Palmer House, Chicago

Apr. 22—Malleable Founders' Society, western sectional meeting, Palmer House, Chicago

May 2-5—American Foundrymen's Society, annual convention, St. Louis

May 20—Malleable Founders' Society, eastern sectional meeting, New York

May 27—Malleable Founders' Society, western sectional meeting, Palmer House, Chicago

June 16-17—Malleable Founders' Society, annual meeting, Homestead Hotel, Hot Springs, Va.

June 27-July 1—American Society for Testing Materials, annual meeting, Hotel Chalfonte-Haddon Hall, Atlantic City, N. J.

Oct. 10-14—American Society for Testing Materials, Pacific Coast meeting, Fairmont Hotel, San Francisco

Papers scheduled to be presented at the congress cover various metallurgical processes, special foundry techniques, casting design and testing of materials. During the five days inspection trips to leading foundries in the Prague district also are planned.

Purdue Will Hold Casting Conference

The Purdue Metals Casting Conference scheduled for the Purdue campus in Lafayette, Ind., Nov. 4 and 5, will feature separate technical sessions on the second day of the conference, for the ferrous and nonferrous interest groups.

Sponsored by the Purdue departments of general engineering and chemical and metallurgical engineering, with the co-operation of the Technical Extension Division of the university, and the Central Indiana and Michiana chapters of the American Foundrymen's Society, the conference will cover subjects of interest to top management, supervisory personnel and any others interested in production and use of castings.

The principal speaker for the ferrous group will be R. G. McElwee, manager Foundry Division, Vanadium Corp. of America, Detroit, and chairman of the AFS cupola research committee. He will be assisted by a panel of specialists including R. Bancroft, Perfect Circle Co., Newcastle, Ind.; William Farrell, Auto Specialties Mfg. Co., St. Joseph, Mich.; and G. C. Dickey, Harrison Steel Castings Co., Attica, Ind.

For the nonferrous group, the pricipal speaker will be Hiram Brown, chief metallurgist, Solar Aircraft Co., Des Moines, Iowa. The panel will include A. T. Ruppe, Bendix Aircraft Corp., South Bend., and R. Langsenkamp, Langsenkamp & Wheeler Brass Works, Indianapolis.

Other subjects to be covered during the two-day conference include: Quality Control; Foundry Mechanization; Foundry Personnel Problems; and The Purchaser Expects from the Foundry—What and Why?

Safety Congress

National Safety Council will sponsor the 36th National Safety Congress and Exposition in Chicago Oct. 18 to 22. Five hotels will house the sessions and expositions. They are: Stevens Hotel, for the industrial safety exposition and industrial sessions; Sherman Hotel, for the public safety exposition and traffic, farm, home and women's safety sessions; Morrison Hotel, for industrial, school and college sessions, and Congress and La Salle Hotels, for industrial sessions.

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FOUNDRY VENTILATING HOODS

Side Wall and Enclosing Types for Every Requirement

● Bartlett-Snow Side Wall Dust-Suckers provide ample room for the molds to be loaded into the shakeout grating and flasks and castings removed with an overhead traveling crane, jib crane or monorail system—see views above. Enclosing type Dust-Suckers vary from the theoretically perfect total enclosure only to the extent of providing needed openings through which the molds can be loaded onto the shakeout and the castings, flasks or bottom boards removed.

All three types prevent dust, smoke and fumes from contaminating the air, reducing labor turnover, absenteeism and increasing production.

Furnished in a wide range of standard sizes, also as overhead canopies and in other special designs. Let us work with you on your requirements!

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Dust-Sucker
FOUNDRY VENTILATING HOODS

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Dust-Sucker
FOUNDRY VENTILATING HOODS

1. Inexpensive to Operate.
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5. Minimum Maintenance.
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7. Low Air Velocity.
8. Picks Up Only Floating Dust.
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10. Sturdy, Serviceable Construction.

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Clean up your Melting Department As Well!

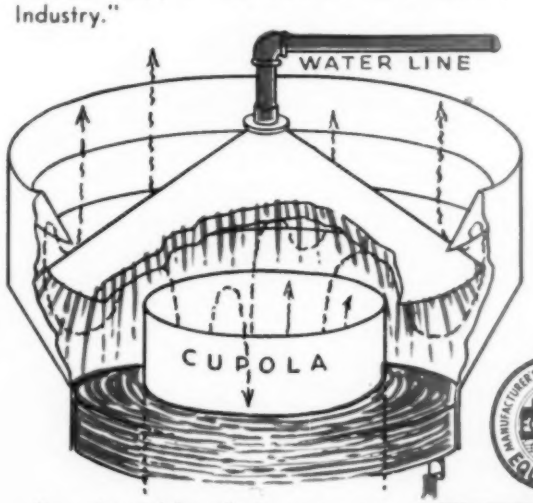
Schneible cupola refuse collecting and handling equipment is unique in providing clean up equipment for every phase of the cupola operation and consists of:

1. **"G M" Type Cupola Collector**
   Collects cupola cinders, metal particles, etc. from cupola stack.
2. **Funnel Type Slag Wool Collector**
   Collects slag, cinders and mineral wool from blow of slag holes.
3. **Slag Quench Trough**
   Quenches slag in water, breaks it into small particles easily handled from slag spout.
4. **Refuse De-Watering Tank**
   Proper size and type to suit your need; settles all refuse and permits re-use of water.

Water for the entire comprehensive system may be recirculated. Normally the water used to collect the cupola stack refuse is dropped by gravity to serve the slag quench trough. Likewise, the water and refuse from the mineral wool collector drops into the slag trough.

The system is simple and easily operated, with minimum maintenance.

The "know how" gained from many installations assures the success of your system. Send for your copy of "Schneible In the Foundry Industry."



The water used for collecting and conveying away the collected material also cools the hood over stack.

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SCHNEIBLE

EQUIPMENT
EQUIPMENT FOR INTIMATE CONTACT
DUST COLLECTION ABSORPTION
CONDENSATION AND TEMPERATURE REDUCTION

TENTATIVE SPECIFICATIONS FOR ALUMINUM-BASE ALLOYS IN INGOT FORM FOR SAND CASTINGS, DIE CASTINGS AND PERMANENT MOLD CASTINGS

ASTM Designation: B 179-47 T; Issued, 1946; Revised, 1947.

(Replaces Former Specifications B 58, B 112, and B 125)[1]

Scope

1. These specifications cover commercial aluminum-base alloys in ingot form for remelting for the manufacture of castings. The specific gravity of these alloys does not exceed 3.0. Thirty-one alloys are specified and are designated as shown in Table I.

Note.—Supplementary data pertaining to the alloys covered by these specifications when used in the form of castings are given in the Tentative Specifications for Aluminum-Base Alloy Sand Castings (A.S.T.M. Designation: B 26),[2] for Aluminum-Base Alloy Permanent Mold Castings (A.S.T.M. Designation: B 108),[3] and for Aluminum-Base Alloy Die Castings (A.S.T.M. Designation: B85).[4]

Process

2. The alloys may be made by any approved process.

Quality

3. The material covered by these specifications shall be of uniform quality and shall be free from dross, slag, and other harmful contamination.

Chemical Composition

4. The alloy shall conform to the requirements as to chemical composition prescribed in Table I.

Sample for Chemical Analysis

5. If the ingots are shipped in carload lots of the same alloy, not less than five ingots shall be taken at random from the carload for sampling. If the shipment is in less than carload lots, one sample ingot shall be taken for each 6000 lb. or fraction thereof. When it is deemed necessary, a sample may be taken from each melt of 500 lb. or more of the alloy.

Sampling for Chemical Analysis

6. (a) The sample for chemical analysis shall be taken by sawing, drilling, or milling the sample ingot in such a manner as to be representative of its average cross-section.

(b) The saw, drill, or cutter used for taking the sample shall be thoroughly cleaned. No lubricant shall be used in the operation, and the sawings or metal chips shall be carefully treated with a magnet to remove any particles of iron introduced in taking the sample.

Methods of Chemical Analysis

7. The chemical analysis shall be made in accordance with the Standard Methods of Chemical Analysis of Aluminum and Aluminum-Base (A.S.T.M. Designation: E 34),[5] or by any other approved method agreed upon by the manufacturer and the purchaser. The analysis may be made spectrographically, provided that, in case of dispute, the results secured by Methods E 34 shall be the basis for acceptance.

Inspection

8. (a) Inspection may be made at the manufacturer's works where the alloys are made, or at the point where they are received, at the option of the purchaser.

(b) If the purchaser elects to have inspection made at the manufacturer's works, the manufacturer shall afford the inspector representing the purchaser all reasonable facilities to satisfy him that the material is being furnished in accordance with these specifications. All tests and inspection shall be so conducted as not to interfere unnecessarily with the operation of the works.

Rejection

9. Material that does not conform to the requirements of these specifications may be rejected, and if rejected shall be replaced by the manufacturer without charge to the purchaser. The full weight of the rejected material shall be returned to the manufacturer.

Rehearing

10. In the case of dissatisfaction regarding rejections based on quality or chemical composition requirements as specified in Sections 3 and 4, respectively, the manufacturer may make claim for rehearing as a basis of arbitration within 15 calendar days after receipt by the manufacturer of the rejection notification.

[1] These specifications comprise a consolidation of, and replace, the former Tentative Specifications for Aluminum-Base Alloys in Ingot Form for Sand Castings (B 58-44 T), and for Aluminum-Base Alloys in Ingot Form for Die Castings (B 125-44 T), and for Aluminum-Base Alloys in Ingot Form for Permanent Mold Castings (B 112-44 T), which specifications were accordingly discontinued in 1946.

[2] 1947 Supplement to Book of A.S.T.M. Standards Part I-B.

[3] 1946 Book of A.S.T.M. Standards, Part I-B.

[4] 1946 Book of A.S.T.M. Standards, Part I-B.

[5] 1946 Book of A.S.T.M. Methods of Chemical Analysis of Metals.

TENTATIVE SPECIFICATIONS FOR ALUMINUM-BASE ALLOYS IN INGOT FORM FOR SAND CASTINGS, DIE CASTINGS AND PERMANENT MOLD CASTINGS

ASTM Designation: B 179-47 T; Issued, 1946; Revised, 1947.

(Replaces Former Specifications B 58, B 112, and B 125)[1]

TABLE I—CHEMICAL REQUIREMENTS

Alloy	Aluminum, per cent	Copper, per cent	Iron, max., per cent	Silicon, per cent	Manganese, max., per cent	Magnesium, per cent	Zinc, max., per cent	Chromium, max., per cent	Titanium, max., per cent	Nickel, max., per cent	Tin, max., per cent	Other Elements, max., per cent Each	Other Elements, max., per cent Total
C1	remainder	4.5 ± 0.5	0.8	1.0 ± 0.5	0.3	0.03 max.	0.3	....	0.2	....	....	0.05	0.15
CG1	remainder	10.0 ± 0.8	1.2	2.0 max.	0.5	0.25 $^{+0.10}_{-0.05}$	0.4	....	0.2	0.3	....	....	0.3
CN21 ...	remainder	4.0 ± 0.5	0.8	0.7 max.	0.3	1.5 $^{+0.3}_{-0.2}$	0.3	0.2	0.2	2.0 ± 0.3	....	0.05	0.15
CS4	remainder	4.5 ± 0.5	1.0	2.5 ± 0.5	0.3	0.05 max.	0.3	....	0.2	0.3	....	....	0.3
CS5	remainder	4.0 ± 0.5	1.0	3.0 ± 0.5	0.5	0.05	0.5	....	0.2	0.3	....	....	0.5
CS21	remainder	10.0 ± 1.0	1.2	4.0 ± 0.5	0.5	1.0 ± 0.5	0.5	....	0.2	1.0	....	....	0.5
CS22	remainder	7.0 ± 1.0	1.2	2.5 ± 1.5	0.5	0.07 max.	2.5	....	0.2	0.3	....	....	0.5
CS23	remainder	6.5 ± 1.0	1.2	5.5 ± 0.5	0.8	0.4 ± 0.2	0.8	....	0.2	....	....	....	0.8
G1	remainder	0.1 max.	0.4	0.3 max.	0.3	4.0 ± 0.5	0.1	....	0.2	....	....	0.05	0.15
G3	remainder	0.2 max.	0.2	0.2 max.	0.1	10.0 $^{+0.6}_{-0.5}$	0.1	....	0.2	....	....	0.05	0.15
GS1	remainder	0.3 max.[a]	0.5[a]	1.8 ± 0.4	0.8[a]	4.0 ± 0.5	0.3	0.2	0.2	....	....	0.05	0.15
GZ1	remainder	0.1 max.	0.3	0.3 max.	0.3	4.0 ± 0.5	1.8 ± 0.4	....	0.2	....	....	0.05	0.15
S1	remainder	0.1 max.	0.6	5.0 $^{+1.0}_{-0.5}$	0.3	0.05 max.	0.3	....	0.2	....	....	0.05	....
S2	remainder	0.3 max.[b]	0.6	5.0 $^{+1.0}_{-0.5}$	0.3	0.05 max.	0.3	0.2	0.2	....	....	....	0.3
S4	remainder	0.6 max.	0.8	5.0 $^{+1.0}_{-0.5}$	0.3	0.1 max.	0.5	....	....	0.5	0.1	....	0.2
S5, S9 ..	remainder	0.6 max.	0.8	12.0 ± 1.0	0.3	0.1 max.	0.3	....	....	0.5	0.1	....	0.2
SC1	remainder	4.5 ± 0.5	0.8	5.5 ± 0.5	0.3	0.1 max.	0.5	....	0.2	....	....	....	0.5
SC2, SC5.	remainder	3.5 ± 0.5	0.8	5.0 ± 0.5	0.5	0.1 max.	0.5	....	....	0.5	0.3	....	0.5
SC6, SC7.	remainder	3.5 ± 0.5	0.8	8.5 ± 1.0	0.5	0.1 max.	0.5	....	....	0.5	0.3	....	0.5
SC8	remainder	3.5 $^{+1.0}_{-0.5}$	1.0	6.0 $^{+1.0}_{-0.5}$	0.5	0.15 max.[c]	1.0	....	0.2	0.3	....	....	0.5
SC21	remainder	1.25 ± 0.25	0.6[d]	5.0 ± 0.5	0.5[d]	0.5 ± 0.1	0.3	0.2	0.2	....	....	0.05	0.15
SC41	remainder	1.5 ± 0.5	0.7	12.0 ± 1.0	0.7 ± 0.2	0.7 ± 0.3	0.4	....	0.2	0.05	....	....	0.5
SC42	remainder	1.5 ± 0.5	0.8	7.8 ± 0.8	0.4 ± 0.2	0.4 ± 0.2	0.5	0.3	0.2	0.2	....	....	0.5
SG1	remainder	0.2 max.	0.5	7.0 ± 0.5	0.3	0.3 ± 0.1	0.3	....	0.2	....	....	0.05	0.15
SG2, SG3.	remainder	0.6 max.	0.8	9.5 ± 0.5	0.3	0.5 ± 0.1	0.5	....	....	0.5	0.1	....	0.2
SN41 ...	remainder	1.0 ± 0.5	1.0	12.0 ± 1.0	0.1	1.1 ± 0.2	0.1	....	0.2	2.5 ± 0.5	....	0.05	....
ZG1	remainder	0.3 max.	0.8	0.25 max.	0.3	0.6 $^{+0.05}_{-0.1}$	5.5 ± 0.5	0.5 ± 0.1	0.2 ± 0.1	....	....	0.05	....

[a] If the copper content plus the iron content exceeds 0.5 per cent, a manganese content of at least 0.3 per cent is desirable.
[b] If agreed upon by the manufacturer and the purchaser, the copper content may be 0.6 per cent maximum.
[c] If agreed upon by the manufacturer and the purchaser, the magnesium content may be 0.5 per cent maximum.
[d] If the iron content exceeds 0.4 per cent, it is desirable to have manganese present in an amount equal to one-half of the iron.

NOTE 1.—Analysis shall regularly be made only for the elements specifically mentioned in this table. If, however, the presence of other elements is suspected, or indicated in the course of routine analysis, further analysis shall be made to determine that the total of these other elements is not present in excess of the limits specified in the last column of the table.

NOTE 2.—The following applies to all specified limits in this table: For purposes of acceptance and rejection, an observed value or a calculated value obtained from analysis should be rounded off to the nearest unit in the last right-hand place of figures used in expressing the specified limit.

Memo

TO MANAGEMENT:

YOUR FOUNDRY MODERNIZATION PROGRAM

must provide for

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Any Foundry Modernization program must provide for efficient plant layout in all departments with mechanization that is justified economically. Properly planned, the program may be put into effect over a two to five year period, virtually paying for itself out of savings as it develops.

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Plan for the future now. Our experienced staff can assist you to develop a Foundry Modernization Program that will pay for itself and insure the successful operation of your foundry in the competitive days ahead.

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THE FOUNDRY DATA SHEET SEPTEMBER, 1948

ACTIVITIES OF FOUNDRY Groups

Cleveland Non-Ferrous

ABOUT 40 membes and guests of the Cleveland Chapter, Non-Ferrous Founders' Society, took part in the group's first golf outing, held July 30 at Boston Hills Country Club. Ed Metzger, Wellman Bronze & Aluminum Co., Cleveland, was chairman of the committee in charge of the affair.

Despite light showers, a round of golf was completed by practically all in attendance, with low gross honors going to Roger Peckinpaugh, Peckinpaugh Metals Corp., Cleveland, on his score of 80.

Chapter Chairman Dave Kennedy, Gluntz Brass & Aluminum Foundry Co., Cleveland, presided at the awarding of golf and door prizes which followed dinner.—*William G. Gude*

Central Ohio

REPRESENTATIVES of the five Ohio chapters of the AFS met at Ohio State University, Columbus, July 22, to make preliminary plans for the Ohio Regional Foundry Conference to be held there next Mar. 11-12. The conference will be sponsored by the Central Ohio Chapter in co-operation with the university and the Canton, Cincinnati, Northeastern Ohio and Toledo chapters.

The group was welcomed to the campus by Dr. Harvey H. Davis, vice president, and Dean C. E. MacQuigg, College of Engineering. These officials promised full co-operation of the university in making the conference a success. It is proposed to adopt as a theme for the conference "New Developments for the Operating Foundryman." Dr. D. C. Williams, Department of Industrial Engineering, Ohio State University, has been appointed general chairman of the conference. Chairman of the program committee is Dan E. Krause, general manager, Gray Iron Research Institute, Columbus, with N. J. Dunbeck, vice president, Eastern Clay Products Inc., Jackson, O., serving as vice chairman.

In addition to the latter three, those attending the meeting included: Fred W. Fuller, Walter L. Deutsch, William T. Bland, Robert Willey and C. T. Greenidge of Central Ohio Chapter; A. D. Barczak and A. J. Smith of Cincinnati Chapter; E. H. Taylor of Canton Chapter; William G. Gude of Northeastern Ohio Chapter; H. G. Schwab of Toledo Chapter; T. S. Dale and H. J. Gonya of Ohio State University Student Chapter.

Toledo

RESULTS of election of officers and directors of Toledo Chapter of the AFS are as follows: Chairman, Emmett E. Thompson, Unitcast Corp.; vice chairman, Harry G. Schwab, Bunting Brass & Bronze Co.; secretary-treasurer, R. C. Van Hellen, Unitcast Corp. Directors for one year

(*Continued on page* 158)

EASTERN NEW YORK: Views of the June 15 dinner meeting held by Eastern New York Chapter of the AFS at Circle Inn, Lathams, N. Y. At upper left is Vaughan C. Reid, City Pattern Foundry & Machine Co., Detroit, guest speaker. J. A. Wettergreen, retiring secretary-treasurer, is shown at top center. Charles Blumenaur, nominating committee chairman, is at top right. Lower left is a view of speakers' table. Group view is shown at lower left. Photos by Leigh Townley, Adirondack Foundries & Steel Inc.

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Foundry management, watching mounting costs, sees profits in MOGUL. This perfect Green Bond makes money because it decreases drying time, yields smooth cores and reduces discards. MOGUL works profitably with pitch or resin because cores can be handled warm. For both green and dry strength use MOGUL in cores.

CORN PRODUCTS SALES COMPANY
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(*Continued from page* 156)

are: A. V. Fromm, American Brake Shoe Co.; N. P. Mahoney, Maumee Malleable Castings Co.; and Otto H. Schmidt, National Supply Co. Directors for two years include: Bernard J. Beierla, E. W. Bliss Co., Toledo Machine & Tool Co. Division; Frank W. Beierla, Clinton Pattern Works; and Brock L. Pickett, Unitcast Corp. Directors for three years: John G. Blake, Alloy Founders Inc.; Gerald R. Rusk, Freeman Supply Co., Perrysburg; and Robert H. Zoller, Zoller Casting Co., Bettsville.

Chicago Non-Ferrous

CHICAGO Chapter of the Non-Ferrous Founders' Society celebrated its annual "Sadie Sandhog Day" at Rolling Green Country Club, July 29. About 60 foundrymen played this popular 18-hole course and 140 enjoyed the 19th hole festivities, the roast beef dinner and the "Harry Swanson Special" floor show. Golf and door prizes were plentiful. Members of the committee in charge of the outing were: "Bud" White, Jack Hodgson, Bill Biedenwieg, Charlie Leitelt and Harry Swanson.

Cincinnati

OFFICERS for 1948-49 term, elected by Cincinnati District Chapter of the AFS, include the following: Chairman, Alexander D. Barczak, vice president, Bardes Forge & Foundry Co.; vice chairman, Austen J. Smith, Lunkenheimer, Co.; secretary, B. A. Gentne, Obermayer Co.; treasurer, Charles S. Dold, Portsmouth Steel Corp.; and assistant treasurer, Walter A. Funck, Reliance Foundry Co. Directors elected for one year are: George A. Avril, G. A. Avril Smelting Works; Charles S. Dold; C. H. Fredricks, Cincinnati Milling Michine Co.; Walter A. Funck; Earl F. Kindinger, Williams & Co.; and Paul Ziegler, H. P. Deuscher Co., Hamilton. Directors for two years: Alexander D. Barczak; B. A. Genthe; Arthur L. Grim, Dayton Malleable Iron Co., Dayton; J. D. Judge, Hamilton Foundry & Machine Co., Hamilton; Walter J. Klayer, Aluminum Industries Inc.; Alfred W. Schneble Jr., Advance Foundry Co., Dayton; and Austen J. Smith. Directors for three years: R. E. Ashburn, Sawbrook Steel Castings Co.; George A. Euskirchen, Cincinnati Foundry Co.; J. H. Pearson, Williamson Heater Co.; A. W. Schlegel, Ideal Pattern Works, St. Bernard; and Russell S. Whitehead, Electro Refractories & Alloys Corp.

Quad City

QUAD City Chapter of the AFS held its annual stag outing June 19 at Camp Nobel on Rock River, just outside of Moline, Ill. C. L. Briceland, J. I. Case Co., Bettendorf Works, Bettendorf, Iowa, was in charge of the arrangement committee which planned golf at Short Hills Country Club, afternoon outdoor activities, chicken supper and evening floor show. Approximately 200 members and guests were present.—*C. R. Marthens, Marthens Co.*

Central Indiana

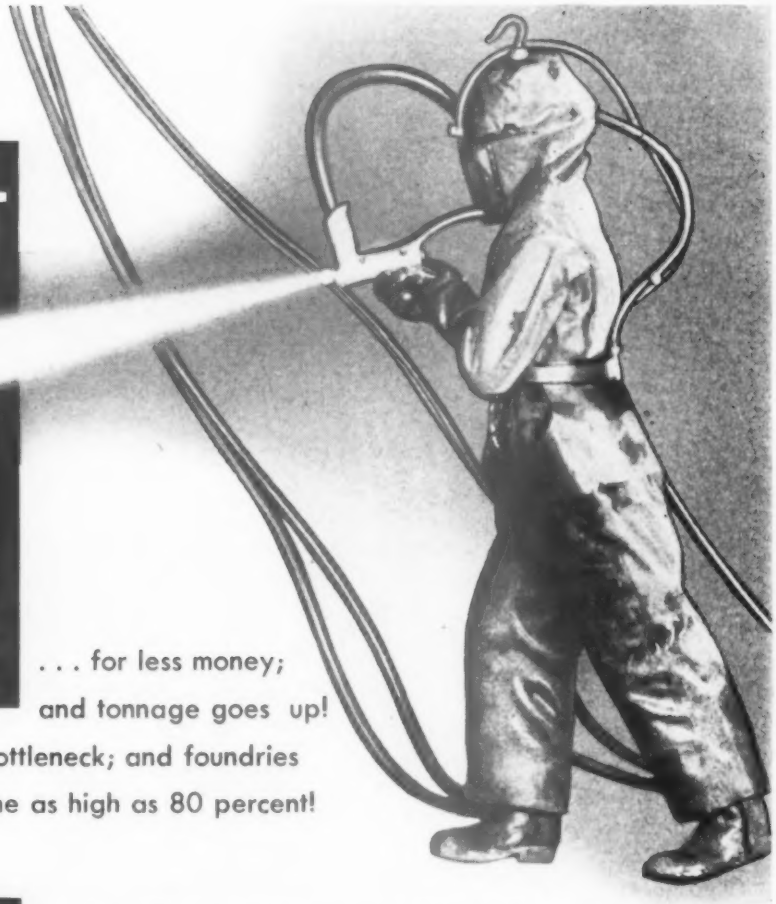
ADVANCE plans for the annual stag picnic of Central Indiana Chapter of the AFS, to be held at the Lakeshore Country Club, Indianapolis, Saturday, Sept. 25, were announced at a chapter directors' meeting recently held in Indianapolis.

Committee in charge of arrange-

(*Continued on page* 161)

WESTERN NEW YORK Chapter of the AFS held its annual picnic at Sturm's Grove near Buffalo, June 26. Photos taken at the outing and reproduced above are by courtesy of Ralph Turner, Queen City Sand & Supply Co., Buffalo

HYDRO-BLAST



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Better sand conditioning has been obtained in many mechanized and semi-mechanized foundries with the NEW WAY Super-Aerator, because it performs in a single unit, all of these important functions: 1. Aerates. 2. Cools. 3. Tempers. 4. Blends. 5. Increases permeability. 6. Decreases casting losses.

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THE New Way LINE

Sand handling, cooling and conditioning equipment, mold conveying systems, reclaiming units, rapless core drawing machines.

SALES OFFICES IN PRINCIPAL CITIES

(*Continued from page* 158)
ments includes Robert Langsenkamp, chapter chairman, A. E. Murphy and Ralph Thompson. Other committees have been chosen to have charge of various picnic activities. The affair will include lunch, golf, horseshoe and baseball tourneys, a chicken dinner and awarding of numerous door prizes. Funds for the outing are provided by donations from individuals and companies interested in the foundry industry.

Saginaw Valley

OSCAR E. SUNSTEDT, vice president and general manager, General Foundry & Mfg. Co., Flint, Mich., has been elected chairman of Saginaw Valley Chapter, AFS, for 1948-49. Other officers elected include the following: L. L. Clark, Buick Motor Division, General Motors Corp., Flint, vice chairman; Raymond H. Klawuhn, General Foundry & Mfg. Co., Flint, secretary-treasurer. Directors for one year are: D. D. Bowman, Almont Mfg. Co., Almont; Robert Calkins, Clio Foundry Co., Clio; and L. A. Cline, Saginaw Foundries Co., Saginaw. Directors to serve two years include: M. C. Godwin, Bostick Foundry Co., Lapeer; C. A. Tobias, General Motors Institute; and Howard H. Wilder, Eaton Mfg. Co., Vassar. Directors for three years: Albert E. Edwards, Chevrolet Gray Iron Foundry, Saginaw; Norman J. Henke, Central Foundry Division, Saginaw Malleable Iron Plant, Saginaw; and Frederick Kent, Buick Motor Division, Flint.

Wisconsin

ABOUT 700 members and guests attended the Wisconsin Chapter of the AFS annual foundry outing at New Ozaukee Country Club, Milwaukee, July 16.

George Tisdale, Zenith Foundry Co., Milwaukee, was chairman of the outing, with S. E. Shaver Archer-Daniels-Midland Co., Milwaukee, taking care of the 179 golfers who played from morning until dusk in perfect weather. Fifteen of the players earned prizes which were awarded at the buffet dinner.

Tom Grossman, Milwaukee, had low gross with a 70. Burleigh Jacobs, Grede Foundry Co., Milwaukee, was second low with 71.

All members and guests received door prizes, and at a drawing, forty received merchandise certificates donated by about 150 foundry supply houses.

Four chapter ex-presidents and about 35 members and guests from outside the city attended the outing. After a good buffet dinner the group was entertained by an all star floor show.—*John E. Hubel*

Non-Ferrous Society Directors Meet

At a meeting of the board of directors, Non-Ferrous Founders' Society, Aug. 8, in Pittsburgh, a survey report on business conditions throughout the country showed that business in brass and bronze castings has levelled off from 50 to 60 per cent of capacity, while aluminum castings are declining further. These conditions were reported primarily due to the increasing price of metal which in turn has stopped inventory buying. Suggestions were presented to deal with the situation which will be investigated by the office of the society.

The society has been notified of its election to founding membership in the Foundry Educational Foundation. G. B. Hazen, Brass Foundry Co., Peoria, Ill., and W. B. Wilkins, American Manganese Bronze Co., Philadelphia, were elected to serve as trustees from the society.

The nonferrous industry is now represented by committee membership on the basic Non-Ferrous Metals

(*Concluded on page* 164)

TRI-STATE Chapter of the AFS held its annual stag party at Veteran's Hut, Tulsa, Okla., June 18, with 115 members and guests present. View of speakers' table is shown at top. Left to right are: unidentified guest, C. C. Beagle, Webb Corp., Webb City, Mo., director elect; Dale Hall, Oklahoma Steel Castings Co., Tulsa, chairman elect; R. W. Trimble, Bethlehem Supply Co., Tulsa, retiring chairman; C. A McNamara Jr., Big Four Foundry Co. Inc., Tulsa, vice chairman elect, and James Winger, Tulsa Iron Works Co., Tulsa, director elect. Lower view, left to right, are: David W. Harris, Frank Wheatley Pump & Valve Manufacturer; Enid C. Duggins, Franks Mfg. Co., and Paul D. Coman, Coman Pattern Works and Big Four Foundry Co. Inc.

Team 'em up

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for profit!

A PERFECT FOUNDRY PRODUCTION TEAM—the Osborn Jolt Rockover Pattern Draw for producing drags and the Osborn Jolt Stripper for copes.

OSBORN

MOULDING MACHINES

MEMBER
MANUFACTURER'S ASSOCIATION, INC.
FOUNDRY EQUIPMENT

(*Concluded from page* 161)

Committee and Overall Foundry Committee of the Munitions Board and plans for representation on the National Security Resources Board are now under way.

Annual meeting of the Non-Ferrous Founders' Society will be held Oct. 21-22, in Philadelphia.

Plan All-Canadian Conference

Second All-Canadian Conference sponsored by Eastern Canada and Newfoundland Chapter of the AFS will be held Sept. 30 and Oct. 1 at the Windsor Hotel, Montreal. An organizing committee composed of James Newman, Newman Foundry Supply Ltd., Montreal, chairman, and Henri Louette, Warden King Ltd., Montreal, and Art Hughes, co-vice chairmen, has been appointed to make complete arrangements for the conference.

Other committees to take care of all details have been set up under the following chairmen: Program—Alfred Lewis, Dominion Engineering Works Ltd. Publicity—Robert Cameron, Webster & Sons Ltd. Housing—John Archambault, LaSalle Coke Co. Plant visitations—Bud Paterson, Refractories Engineering & Supplies Ltd. Registration—Luce Guilmette, Canadian Foundries Supplies & Equipment Ltd. and John Hunt, Dominion Engineering Works Ltd. Entertainment—Cecil Rowe, Crane Ltd.

The conference is open to members of the AFS as well as nonmembers, and foundrymen from outside areas are invited to attend any or all of the sessions. One hundred and fifty rooms have been reserved for the occasion at the Mount Royal, Windsor and Laurentien Hotels.

The technical program is as follows:

Thursday, Sept. 30

Morning .....Registration
12:30 p.m.—Luncheon, Windsor Hotel
2:15 p.m.—Plant visitations
8:00 p.m.—Motion picture, "River of Paper," courtesy of G. Harold Fisk, agent for Powell River Co. Ltd., Montreal.
8:30 p.m.—"Dust Control in the Foundry," Allen D. Brandt, Bethlehem Steel Co.

Friday, Oct. 1

9:30 a.m.—Plant visitations
2:30 p.m.—Three group meetings
Steel Session—Chairmen, W. J. Hall, Fahralloy Ltd., and C. V. Hacker, Lynn McLeod Metallurgy Ltd. Speakers, V. E. Zang, Unitcast Corp., "General Steel Foundry Procedure," and I. Ferron, Joliette Steel Ltd., "Laboratory vs. Foundry Controls."
Cast iron session—Chairmen, C. Johnston, E. Long Ltd., and J. Grieve, Dominion Engineering Works Ltd. Speakers, I. Shepherd, Beach Foundry Ltd., "Mechanization in the Foundry," and E. C. Winsborrow, Shawinigan Foundry Ltd., "Cupola Melting."
Nonferrous—Chairmen, J. Dalby, Wilson Brass & Aluminum Foundries Ltd. and Harold J. Roast. Speakers, J. C. Converse, Crane Ltd., "Modern Methods of Brass Foundry Operation," and H. W. Bennett, Dominion Engineering Works Ltd., "Molding Methods."

ANTHRACITE COAL CONSERVES COKE

(*Continued from page* 85)

From the previous discussion on the types of castings and requirements relative to their physical characteristics, it may be seen that any change in established melting practice necessitated a cautious approach so that there would be no interference in meeting the daily castings production. Hence, while use of anthracite coal seemed a logical solution to the fuel problem, some procedure had to be developed to determine its suitability in view of the foregoing conditions.

(*Concluded on page* 166)

SOUTHERN CALIFORNIA: In attendance at the May meeting of Southern California Chapter of the AFS were, upper left, left to right: E. K. Appleman, Calmo Engineering Co., Los Angeles; Earl A. Tibbitts, Los Angeles Steel Castings Co. Ltd., Los Angeles; J. A. Oliva, Chamberlain Co., Los Angeles, and R. L. Valentine, D. C. Hansen, C. E. Gunselman and Jack Thompson, Rich Mfg. Co., Los Angeles. At upper right are newly nominated officers for 1948-49: Left to right are: L. O. Hofstetter, Brumley-Donaldson Co., Los Angeles, president; John E. Wilson, Climax Molybdenum Co., secretary, and Earle D. Shomaker, Kay-Brunner Steel Products Inc., Alhambra, Calif., vice president. At lower left are: H. E. Russill, Eld Metal Co. Ltd., retiring chapter president; Norman J. Dunbeck, Eastern Clay Products Inc., Jackson, O.; Dr. James T. MacKenzie, American Cast Iron Pipe Co., Birmingham, Ala., and Mr. Hofstetter. At lower right are new chapter directors elected for a two-year term. Left to right are: John J. Derkin, Los Angeles Steel Castings Co. Ltd; James H. DeWald, Bell Foundry Co., South Gate, Calif., and Donald A. Eggleston, Ace Foundry Ltd., Huntington Park, Calif.

FOR FAST, ACCURATE LINE-UP OF COPE AND DRAG, USE UNIVERSAL FLASK PINS AND BUSHINGS

Once you install Universal precision made Standardized Flask Pins and Bushings *you can forget about cope and drag alignment troubles.* Universal Flask Pins and Bushings are hardened and ground for maximum resistance to wear. Cope Bushings are quickly guided to the Drag Pins over tapered, loose-fitting closing pins which are easily removed after assembly. Special design permits longitudinal expansion to compensate for metal heat, *without affecting accurate alignment.*

Available for immediate delivery in several sizes of round, elongated, press fit and taper types for use in cast iron, steel, aluminum, and magnesium flasks. *Special types and sizes to order.* Write for complete information.

UNIVERSAL ENGINEERING COMPANY

FRANKENMUTH 4, MICHIGAN

(*Concluded from page* 164)

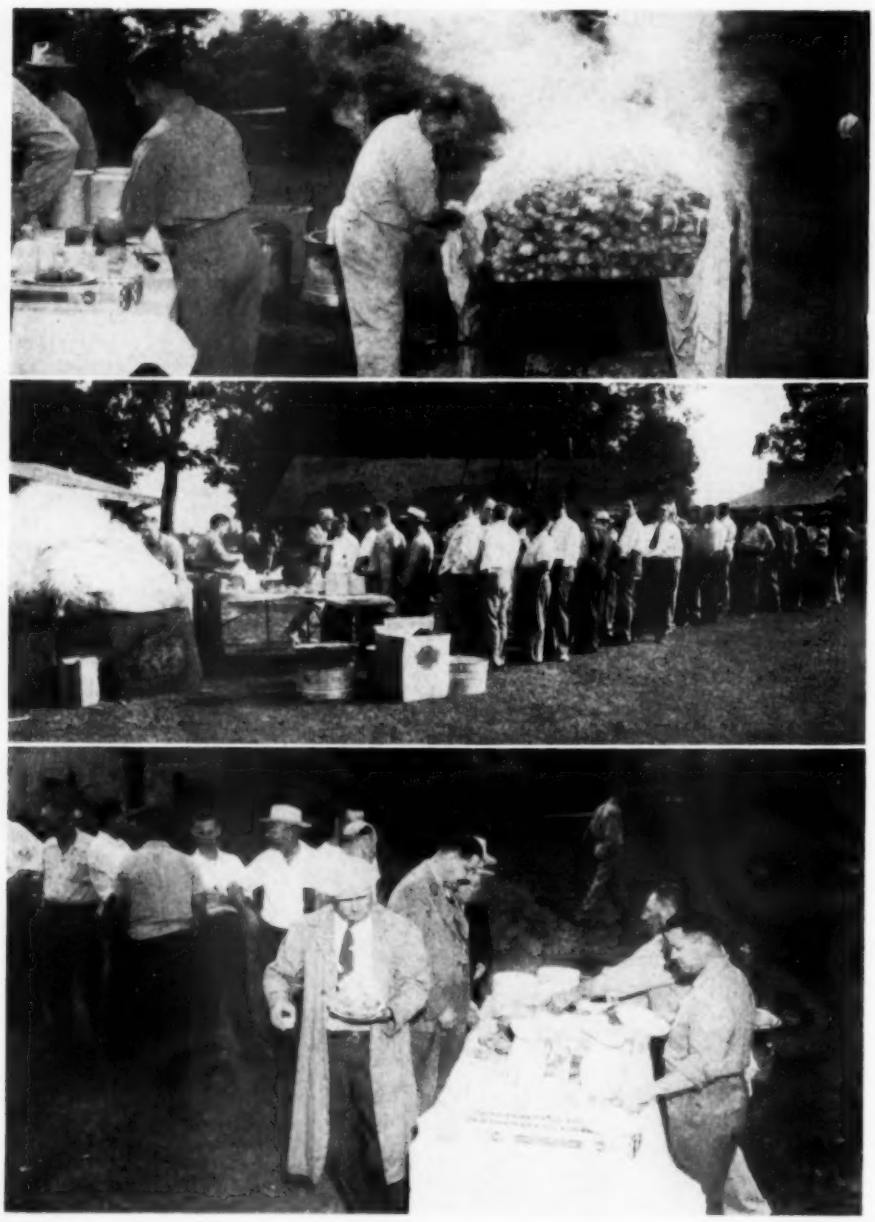
Solution was to try varying substitutions of anthracite for coke on the last five charges of the heats for several days. Results of those tests indicated that 25 to 30 per cent coal could be used without any change in casting quality as determined by the previously mentioned control tests. Type of anthracite used is called broken grade, which has dimensions of 3¼ x 4½ in. on the round-hole screen and is equivalent to 2½ x 3½ in. on the square-hole screen.

Next the number of coke-anthracite charges was increased gradually, beginning with the last charge and working toward the first, until at present all but the first ten charges contain mixed fuel. Reason for this arrangement is that early charges contain considerably more steel scrap for pouring off much heavier section castings, such as street-lighting standards. However, it is expected that with more experience, the coke-anthracite fuel charges also will be applied there. Investigation will be made to determine whether the percentage of anthracite can be increased, and how much.

In recapitulation it should be pointed out to those interested that the bed is comprised only of coke, forked to eliminate as much small size as possible. It extends 52 in. above the tops of the tuyeres. The fuel is charged in bottom-dump buckets with split bottom, and the procedure is to place the weighed amount of coke in the bucket and follow with the weighed amount of anthracite coal. Iron charges are put into a separate bucket.

Iron charges weigh 1200 lb, and with a fuel-to-iron ratio of 1:5 to 6 the amount of anthracite used ranges from 50 to 80 lb. Typical iron charge contains 400 lb pig iron, 600 lb home or return scrap, 140 lb foreign gray iron scrap, and 60 lb steel scrap. Charges are fluxed with 80 lb limestone. Melting rate is 4 tons per hour and the cupola operates 8½ hr per day with a lunch-time shutdown between 11:30 and 12:00. Air is supplied to the cupola at the rate of 250 to 325 lb per minute. (For those wishing to convert air weight to volume, the value of 13 cu ft per lb is a close approximation.)

It should be pointed out that the procedure described gives an iron over the spout with a temperature of 2800°F which has to meet close limitations on electrical resistivity, machinability, soundness and requisite fluidity for castings which may vary in thickness from 1/16 to ¼-in. in the same piece.



CENTRAL ILLINOIS Chapter of the AFS held its second annual Clambake Stag June 12 at Keenland Park, near Peoria, Ill.

SAFE OPERATION OF PORTABLE GRINDERS

(*Concluded from page* 89)

steel SAE 1008. It is designed for maximum wheel thickness of 2 in. For wheel diameters of 2 to 5 in. dimensions *A* and *B* should be 1/16-in. and for 6 to 8-in. wheels *A* should be 3/32-in. and *B* 1/16-in. For snagging, cup wheels should be guarded by a band type hood of the sort shown in Fig. 20.

The revolving cup guard shown in Fig. 2 has been used with good results on plain hole cup wheels. It should not be used with threaded hole wheels, for there is nothing to hold the pieces in the guard in case of breakage. With a plain unthreaded wheel, the flanges hold the pieces in the guard. This device replaces the fixed flange on the machine. It is secured to the spindle by a key or other device. They are limited to speeds under 9500 fpm, and to wheels of 8 in. or less diameter.

It will pay for management to see that personnel, including operators and supervisory employees, are acquainted with these safety precautions, and that they are enforced by adequate inspection.

Columbia Steel Co., Torrance, Calif., will discontinue its foundry operations and concentrate activity on rolled steel products. All other steel producing units will continue in operation at the Torrance plant.

Installed in 1937

and still competitive and highly efficient today

BOTH past and present performance of the Bartlett-Snow equipment in the grey iron foundry of this large mid-western automobile manufacturer, demonstrates the ability of Bartlett-Snow engineers to accurately analyze foundry problems, and then design, build and install equipment that will repay its initial cost within a short time,—and return handsome profits to the purchaser for years and years thereafter.

The shakeout and spill sand in this foundry is collected on conveyors in the basement, passed through a rotary cooling screen, mulled and aerated. The prepared sand is then handled on an inclined 24" belt conveyor (see view above) eliminating the need for bucket elevators, and distributed over the fly wheel line molding machines. Sand not needed by the eight molding station on the fly wheel line is carried to the head line on a cross belt, thus permitting sand to be distributed to two complete loops. The continuous mold conveyor loop shown above consists of 95 cars of Bartlett-Snow's heavy duty, two axle, four wheel design with steel plate tops 20" wide with 5'-0" centers.

Let the Bartlett-Snow foundry engineers, with their long and intimate experience with the needs of practical day to day foundry operation, work with you on your next sand, mold, or castings handling problem. It's your assurance that all equipment will be designed to adequately serve both present and future needs; and synchronized and coordinated into an efficient, compact, profitable and easy to operate unit. The C. O. Bartlett & Snow Company, Cleveland 5, Ohio. Engineering representatives in New York, Baltimore, Detroit and Chicago.

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CLEVELAND 5, OHIO

DESIGNING AND CONTRACTING ENGINEERS

For the Foundry Industry

SAND, MOLD AND CASTINGS HANDLING EQUIPMENT

READERS' COMMENT • • •

Apprentice Training

TO THE EDITORS:

THE FOUNDRY for July, page 145, has an interesting reply to my letter on apprentice training which appeared in May. However, the letter also is an interesting example of the manner in which too many people read hastily. I stated that in two years I could train an apprentice to accept and hold a journeyman's job, but I would not claim that an apprentice with two year's training was competent to make any and all types of patterns. The school instructor better not bet any money on the two-year journeymen.

The trade was taught in a Chicago school many years ago. A business agent accepted the lads as journeymen and sent them out on jobs. Some of the boys failed and quit the trade. Many made good and still are working in pattern shops. This was before 1926.

In the last two years patternmaking has changed rapidly in methods and the time required to do good work. Cast pressure plate work cuts time in the metal field. For example, these patterns now used on crankcases and oil pans have cut the patternmaking time practically in half. Many jobbers do not seem to know or care that costs may be cut by studying different ways to make the pattern. In many instances the object seems to be how to put in maximum time on the job, instead of producing a good job and one that will serve the foundry best.

According to the union rules an apprentice training period is five years. In this period the apprentice gets no credit at all for the time spent in school. From the employer's standpoint, it takes about two years for the apprentice to forget the school methods and learn to do work as the shop wants it done. Why? The customer always is right so long as he pays for what he wants. Many patternmakers have heard the story of the congregation which specified a brick out-house on the roof of the new building.

Why does an apprentice have to go to school to learn how to add fractions? This happened in one of our shops recently. One of three boys in the shop could not add fractions. You and I learned how to do this before we passed into one of the lower grades.

Some years ago in Detroit, apprentice patternmakers were given two years in the shop and two years in a twice-a-week school. Shop work was advanced as school taught the boys. Most of the boys were fired for one year after the two-year period. The union took them in as members and on the next job they were rated as journeymen who turned out a creditable day's work on automotive patterns. Today you can't hire journeymen patternmakers able to make auto patterns except under a lead man who runs the job in the shop and just about has to show them how each part is made. He also does all the laying out. If you are sufficiently interested, I can give you a real story on the pattern apprentice situation.

Ever hear of a three year apprentice who grew a vandyke beard so that he could change jobs and receive a journeyman's pay and rating? I did this during World War I and after a week became a lead man in an auto pattern shop. This was a Detroit snop.

EARL HOLMES

Cleveland

° ° °

How To Handle Al-Mg Alloys

TO THE EDITORS:

In the May, 1948 issue of your magazine, on page 147 of the Question and Answer Section, I saw a question concerning the handling of aluminum-magnesium alloys, particularly 220. You may have answered the question more fully elsewhere, but there are several things which I think should be explained to the person who submitted the question.

In the first place, a great many of the foundry difficulties of 220 seem to occur as a result of the drossing tendency of the magnesium present. It is reported that tendency is largely overcome by the addition of beryllium in amounts as low as 0.005. This may be accompanied by small amounts of calcium depending on the properties desired.

In the second place, you recommended heating the metal to 1470-1560° F in the furnace, pulling the pot and cooling the metal to 1290-1330° F before pouring. This "superheating" was apparently suggested as a means of securing good grain size. Foundrymen in general do not believe this is the best practice. It is usually recommended that the metal be heated not over 1400° F. Grain size and dross removal from the molten metal may be accomplished by the use of boron trichloride.

At least one large foundry reports that by using the above procedures they can successfully cast 220 in natural molding sand used for their other aluminum alloys.

HIRAM BROWN
Chief Metallurgist

Solar Aircraft Co.
Des Moines 5, Iowa.

° ° °

Graphite and Wear Resistance

TO THE EDITORS:

In your May number I read with deep interest the very excellent contribution, "Wear Resistance of Gray Iron Diesel Engine Liners," by Mr. T. E. Eagan, chief metallurgist of the Cooper-Bessemer Corp.

Therein one noted his reference to 'LODED' Cast Irons, namely, a series of high-silicon high-chromium all-pearlitic irons which are the subject of both American and British patents. The aim of 'LODED' Irons was to produce free-machining gray irons equalling, at least, the performance of more expensive cylinder liner and piston ring materials which, in England, included those containing alloying elements more costly than chromium and, also, the heat-hardened and tempered liners. It would be enlightening in your country to conduct the same type of tests whereby 'LODED' Irons were successfully launched on the competitive markets of this country.

For example, take, say, ten identical engines, equip the even-numbered cylinders of five of them with 'LODED' liners, likewise the odd-numbered cylinders of the other five; the remaining cylinders of the ten engines being equipped with any one of the irons mentioned by Mr. Eagan. After no less than a year's running of the engines *under genuine service conditions such as are known to induce wear,* each cylinder is opened and its wear accurately measured all round. The results, plus anything else such as oil-consumption, ring wear and so on, are compiled and compared. The best liners are those which, under the particular service conditions, give the best all-round commercial result commensurably with first cost.

Years of experience established the fact that each make of engine and each type of service gives its own result. For instance, an engine on one service might suffer very little wear at all whereas the same engine

on a different service might have severe wear.

Obviously, a cylinder liner material for the open market should be able to satisfy almost everyone.

Whatever quality of 'LODED' Iron is selected its composition must be balanced to give a ferrite-free structure *throughout the wearing-areas of the walls of the liner concerned.* An experience of cylinder and ring wear covering many types and sizes of engines on land, sea and beneath the sea. has rendered me chary of attaching meaning to particular formations and distributions of flake graphite. 'LODED' Irons were not conceived with any reference to graphite form because, given a *stable* ferrite-free pearlitic matrix, the graphite flakes, as far as I have seen, may form fours or squares without doing either harm or good to the final wear-result. 'Random' graphite and descriptions such as 'well-distributed' graphite have become, to me, but random talk.

I have often examined gray iron castings after they have come out of long and splendid service and not infrequently have they had rosetted, bird's nest, or fir-tree graphite arrangement. In England what is held to be good and proper flake graphite formation has fluctuated periodically like women's dress-length. May I conclude by congratulating Mr. Eagan upon his instructive and intriguing article and may I ask him to understand that the above ideas are based upon my experience to date whereas my observation tomorrow may prove them all wrong, in which case I shall say so. After all, the truth about anything as revealed to him from day to day is all a man has upon which to found his opinions, scientific or otherwise; and his days are numbered.

HORACE J. YOUNG
M. I. Mech. E., F.I.M.
15, *Lansdowne House*
Manchester, 20, *England*

Editor's Note: Mr. Eagan has the following comments to make concerning Mr. Young's remarks:

I have read with interest the letter that Horace J. Young has written with reference to my article in the May issue of THE FOUNDRY, "Wear Resistance of Gray Iron Diesel Engine Liners," in which, of course, I mentioned Loded.

This is a rather interesting letter, but I am afraid that Mr. Young did not see the point in the comment about this type of material. It is extremely brittle and does not lend itself easily to static casting, due to extensive shrinkage. Of course, I do not go along with these comments on the graphite distribution. I think the point regarding random flake graphite or AFS type A graphite has been too well proven to deny that it nas any effect on wear resistance. Even in the case of these high-silicon type of materials I am quite sure that wear resistance would be improved by insuring that the iron has random flake graphite.

T. E. EAGAN, Chief Metallurgist
Cooper-Bessemer Corp.,
Grove City, Pa.

° ° °

Early Molding Machines

TO THE EDITORS:

Among the voluminous portfolios containing my grandfather's many patents I found the attached small photograph showing, presumably, one of his mechanics standing by one of the earliest molding machines. The picture was made in Brooklyn, but

unfortunately the date does not appear. The design suggests that my grandfather and his merrymen were blessed with a nice aesthetic sense in addition to their inventive genius. However, it is only fair to admit that all the machines built and sold by the company were not quite so artistic.

My grandfather's interest in molding machines was only a secondary character. His primary interest was in the establishment and steady progress of the Malleable Iron Fittings Co. In this field he had many patents on molding machines and tapping machines for pipe fittings. These machines were developed and built for use in a plant where he was president and general manager. Apparently, in the early days, the company capitalized on some of the extra-curricular ideas and sold, or leased, the machines to other fittings manufacturers.

From the files concerning my grandfather's molding machine patents, it is quite obvious that he was one of the first designers and builders of molding machines in this country. The files also show his success in preventing other firms from infringing on his patent rights. Only occasionally, as indicated by a vast correspondence, was he involved in litigation.

The molding machine business carried along as a side line by my grandfather, T. F. Hammer, finally was sold to a New Haven firm.

THORVALD F. HAMMER
President and General Manager
Malleable Iron Fittings Co.
Branford, Conn.

Editor's Note: Mr. Hammer's grandfather devoted all of his time to the operation of the Malleable Iron Fittings Co. His successful pioneering in a new field, the even more remarkable career of his son Alfred E. Hammer, bulk large in malleable iron history.

° ° °

Defends the Patternmaker

TO THE EDITORS:

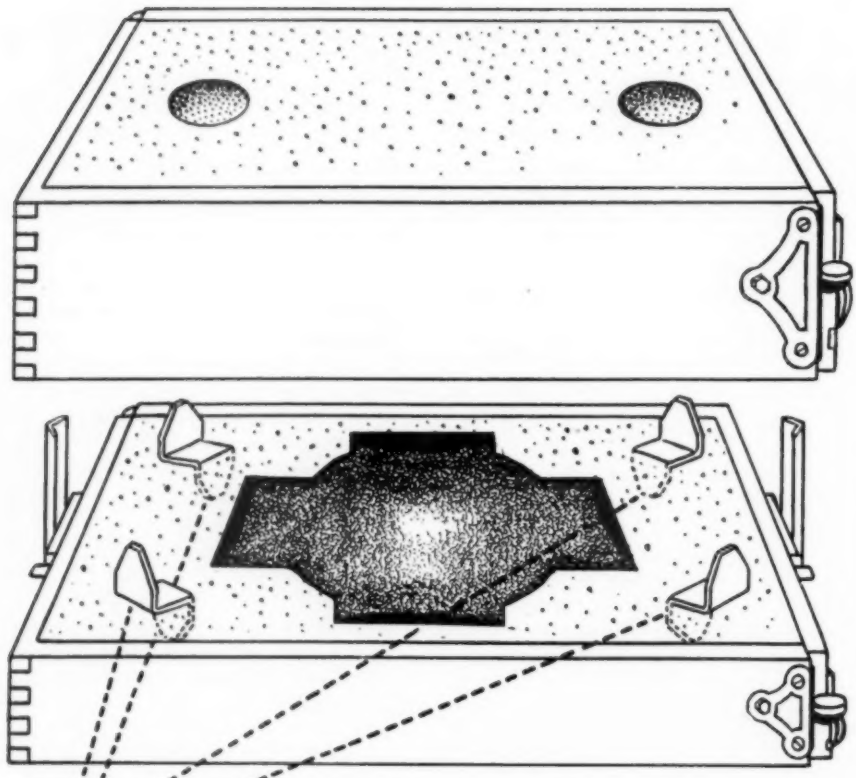
As an interested reader of THE FOUNDRY for many years I want to congratulate you on the many fine issues you publish every year.

I noticed quite a few criticisms of pattern equipment and their producers in recent issues, especially the May issue. I know there is good and bad in the pattern business, as in any other profession, but there seems to be too little praise for the patternmaker in your magazine as compared to his blame for faulty castings.

For example, in your May '48 issue you print a speech of Mr. Bean of Yellow Springs, Ohio, on page 294. I wonder whether Mr. Bean can back up his statement, about imperfect patterns, with a clear conscience. If he can, I certainly advise him to change the source of his pattern equipment.

I am a patternmaker and supply one of the biggest foundries in Baltimore with most of their pattern equipment. I have seen thousands of castings on the scrap pile over a period of years. Faulty molding, bad iron, etc., was to blame for the scrap, and I doubt, although there are no official records, that 1/10 per cent of the scrap was due to faulty pattern equipment.

In a different place your magazine prints that pattern shops are ill



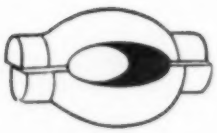
STOP Costly SHIFTS, CUT Scrap Losses . . . with MILWAUKEE Mold Anchors

MILWAUKEE MOLD ANCHOR Pat. Applied For

Foundrymen who have given MILWAUKEE Mold Anchors a practical trial on snap-flask and slip-flask molds have found that they cut costs . . . earn extra profits in 2 ways: —

1 **They prevent shifts between cope and drag . . . resulting in higher production and lower scrap casting losses.**

2 **They eliminate the need for *expensive offset pattern* plates.**



Shifts make Scrap Castings . . . even a slight shift between cope and drag causes enough misalignment between upper and lower halves of casting to make scrap of it.

Give MILWAUKEE Mold Anchors a thorough trial on slip-flask and snap-flask work and see for yourself how they stop costly shifts, cut scrap losses, earn extra money for you!

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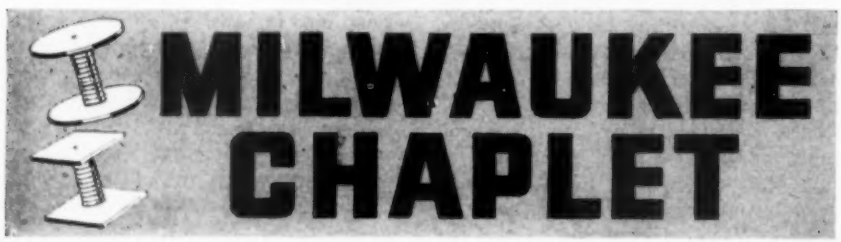

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equipped and way behind time. Well I would like to remind the foundries that they are the ones who order patterns, and many a foundryman is afraid to spend a few extra dollars on an improved type of pattern and save hundreds of dollars in the long run. So what is the use of having modern equipment in a pattern shop and not be able to use it because of inability to sell the patterns that can be made with it?

On the other hand, there are plenty of pattern shops whose equipment is up to date because they have the right foundries to deal with.

JOSEPH KNOLLER

5811 *Winner Ave.*
Baltimore 15

° ° °

Foundry Improvements Neglected

TO THE EDITORS:

After reading the article by R. L. Lee, April issue, I can see why his friend was disappointed in the foundry as a vocation.

I have been in a supervisor's capacity in foundry work for several years—seven years with the company I am with today.

This company's policy is to make first class mechanics of all apprentices. We have several G. I.'s in training. To sell the foundry to one of these boys is a tough job for anyone. I make it a practice to talk to these apprentices at least twice a day to try to keep them from losing interest. I take them to the cleaning room so that they can see the results of their work. I give them a day now and then in the pattern shop, and a day occasionally on the cupola. They have no work to do in either pattern shop or cupola; I only ask them to take notes and explain to me what they observed from watching the men doing the work and asking why it was necessary.

We have an up-to-date technical laboratory for sand testing. I take the men there and explain what each piece of equipment is used for, and show them how it operates. I try to explain to them the years that I have served in the foundry, and try to convince them that I am as well off as any other tradesman; and with all this effort, I find it hard to keep an apprentice until he serves his full four years.

Until the foundry is cleaned up, and adds some dignity to foundry work, it is going to be hard to keep young men, intelligent enough to make good mechanics, in the trade.

Companies will spend money cleaning up around the yards, cleaning

(*Continued on page* 172)

There's no guessing here!

In these days of rising costs and material scarcities, production men depend on Ingersoll-Rand Air Tools to take the guesswork out of cutting manufacturing costs and increasing production. From Ingersoll-Rand you get Air Tools which are faster—more powerful—lighter—smaller—smoother—safer—sturdier. Air Tools enable your workmen to do more work with less effort.

Call the nearest Ingersoll-Rand branch office to get the facts on our complete line of Air Tools—screw drivers—impact wrenches—grinders—chippers—riveters—hoists—drills—etc. Ask one of our representatives to show you how Air Tools pay for themselves nearly twice as fast under today's conditions.

ROCK DRILLS • COMPRESSORS • AIR TOOLS •
CENTRIFUGAL PUMPS • TURBO BLOWERS
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Cut Costs Where Costs Start . . . in the Foundry Yard!

Speed up your foundry yard unloading, rehandling and storing of foundry supplies and materials. Cut these non-processing production costs, save demurrage charges, reduce handling time!

New, higher speed NORTHERN OVERHEAD ELECTRIC TRAVELLING CRANES will minimize man-hour service time, set the pace for faster, safer material handling, cut over-all costs where costs start.

★ **Let us send you Bulletin No. 122-C** ★

OVERHEAD ★ ELECTRIC CRANES ★ AND HOISTS ★

NORTHERN ENGINEERING WORKS

2615 Atwater St., Detroit 7, Mich.

(*Continued from page* 170)

machine shops, painting, installing good lighting and heating for comfort, but the foundry remains cold drafty, poorly lighted and dirty.

The foundry can be made a good place in which to work. Foundry work requires as much skill as any other trade. A molder can be just as proud of a good casting as any other mechanic can be of his product.

JAMES M. HENDRIX
735 *Cowper Street*
Palo Alto, Calif.

° ° °

Permanent Mold Casting Weights

TO THE EDITORS:

In the May issue of your Journal on page 234 there is a statement attributed to Mr. E. C. Hoenicke, of Detroit, which calls for some comment if not correction.

He is reported as saying, during his address to members of the AFA of Cincinnati, on the production of gray iron casting by permanent mold process that among other limiting factors the maximum weight on a single casting must be 10 lbs and the section thickness is limited to 1¼ in. maximum.

It is difficult to believe that Mr. Hoenicke has been correctly reported, as we in Derby are producing by the same process single castings up to 35 lbs in weight, and have successfully made large quantities of castings with section thickness up to 3½ in. or even greater.

At the present time many thousands of castings with 2 in. to 3 in. section thickness are going through our shops and it is surprising to know that according to the report in question, equal success is not being achieved in your country.

C. D. POLLARD
General Foundry Manager
Qualcast Ltd.
Derby, England

Editor's Note: Mr. Hoenicke explains his remarks concerning casting weights as follows:

The talk I made at the Cincinnati Chapter of the American Foundrymen's Association was entirely impromptu and during the discussion period there were a number of questions asked regarding "high production of permanent mold gray iron castings."

In this type of operation, the time element is of the greatest importance and our experience has been that a casting of approximately 10 pounds in weight and with a 1¼ in. section is about the largest practical size for

(*Concluded on page* 174)

TODAY, AS ALWAYS the *Strongest Fire Clay Bond* is the MOST ECONOMICAL BOND!

• We are now mining Revivo Bond at Bondclay, Ohio, in the most highly mechanized clay plant in the country. Here, ample deposits and these modern facilities enable us to maintain the outstanding excellence of this product.

HIGHER strength saves clay. Revivo's durability and low initial cost mean lowest possible sand costs. Also, you have higher permeability, higher flowability, higher refractory properties and a higher sintering point, lower moisture, lower handling costs.

Ever since ECP pioneered synthetic sand 25 years ago, our customers have agreed that ***Revivo is the strongest fire clay bond*** *(20% to 100% stronger than most)*

★ ★ ★

EASTERN CLAY PRODUCTS, Inc.
JACKSON, OHIO

REVIVO BOND

Revivo is one of five ECP products. These, with many combinations, enable us always to recommend the very best bonding clay or variation for your exact purpose.

HOW TO SAVE MAN HOURS

Simply let your foundry supply house tell you about
COMBS GYRATORY FOUNDRY RIDDLES

Type CS, pictured here, is priced $290. complete. It is one of several available types, and represents a real, labor-saving investment. Hours formerly lost are returned to management . . . and from that point, management picks up the ball. Made especially for foundry use by:

Great Western
Manufacturing Company
LEAVENWORTH, KANSAS

(*Concluded from page* 172)

good high-speed, efficient operation.

It is well known that permanent mold gray iron castings can be made that weigh as much as 30 to 40 pounds but for production operation, and I use the term in the sense of "high-speed American production," our experience has been that the permanent mold process is primarily a method to produce small gray iron castings in large, repetitive quantities.

EDWARD C. HOENICKE
General Manager, Foundry Division
Eaton Mfg. Co., Detroit 13

OBITUARY

ROLLAND C. ALLEN, 67, nationally known metallurgical and mining engineer, and executive vice president of Oglebay, Norton & Co., Cleveland, died there July 18. A graduate of University of Wisconsin, Mr. Allen became associated with Oglebay, Norton & Co. in 1923. During the recent war he served as deputy chief of the Iron and Steel Branch, War Production Board, Washington, and later became vice chairman of the Metals and Minerals Division of that board. He was president of the board of directors of Battelle Memorial Institute, Columbus, O.

* * *

George M. Goepfert, 60, assistant to the works manager, Belle City Malleable Iron Co., and Racine Steel Castings Co., Racine, Wis., died July 21, in St. Mary's Hospital, Racine. Mr. Goepfert joined Racine Steel Castings Co., a subsidiary of Belle City Malleable Iron Co., in 1911. He became steel foundry superintendent in 1916 and was made assistant to the works manager in 1944.

* * *

Frank V. Horstman, 49, works manager of the American Manganese Steel Division, American Brake Shoe Co., St. Louis, drowned July 22 in the Mississippi River, while attending an outing for plant managers and other executives of four of the company plants in the St. Louis area. He had been associated with the company for 30 years.

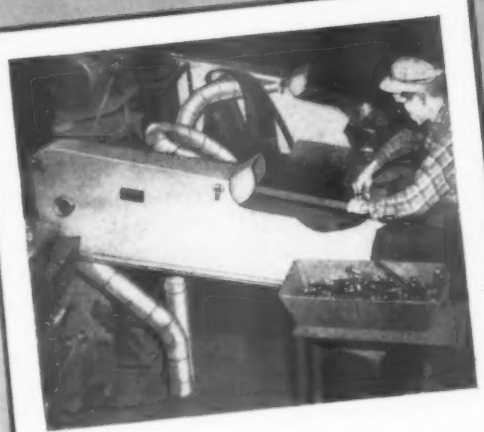
* * *

Walter E. Piper, 63, one of the organizers and a former partner of the Beardsley & Piper Co., Chicago, was killed Aug. 5, when his plane crashed near Oshkosh, Neb. Mr. Piper was flying from his Los Gatos, Calif. home to Chicago. Mr. Piper and his partner, E. O. Beardsley, were the inventors of the sandslinger

(*Continued on page* 176)

UNIQUE DUST CONTROL HOOD...

SAVES SPACE GIVES BETTER LIGHT!!



Shown above is an abrasive polishing operation in the Mechanics Tool & Forge Co. Note how totally enclosed hood permits efficient working position for operator.

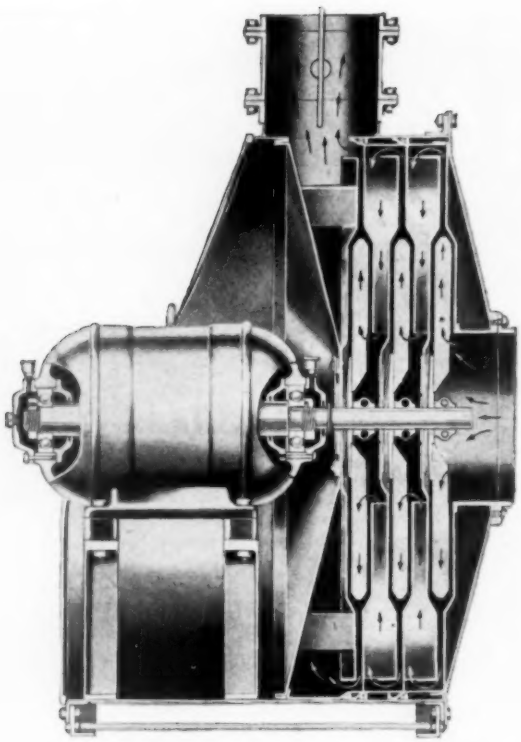
Illustrating the ingenuity of KIRK & BLUM Engineers is a recent installation of grinding hoods at the Mechanics Tool & Forge Co., Sabina, Ohio. To fit space limitations and to avoid interference with lights, all dust collecting piping was installed in trenches below floor level. In doing this, Kirk & Blum grinding hoods were adapted to "top-of-wheel" grinding which offers many advantages in the grinding of hand tools.

If you have a problem involving dust collection and metal fabrication, call on KIRK & BLUM Engineers. Their experience can be a valuable asset in your plant. The Kirk & Blum Mfg. Co., 2808 Spring Grove Ave., Cincinnati 25, Ohio.

FOR CLEAN AIR... THE INVISIBLE TOOL

KIRK AND BLUM

DUST CONTROL SYSTEMS



Why **SPENCER TURBO-COMPRESSORS**

Are Preferred in Foundries

A look at the inside of a Spencer Turbo indicates some of the reasons why they have been giving satisfactory service in foundries. There are only two ball bearings. When properly greased, the Spencer Turbo will run day in and day out with original test efficiency for years. In fact, many are still serving faithfully after 40 years' service. Note the wide clearances, the streamline flow of air, and all metal reinforced construction and the light weight impellers and low peripheral speeds. And remember that the Spencer uses power only in proportion to the work done and that balanced, quiet operation is inherent in the Spencer design.

ON CUPOLAS—Constant volumes of air are maintained by manually controlled gate valves. Calibrated ammeter indicates weight or volume. Automatic air weight control can be obtained when desired. Ask for the bulletins.

SPENCER
HARTFORD

THE SPENCER TURBINE CO
HARTFORD 6, CONN.

ASK FOR BULLETINS

Foundries	No. 112
Data Book	No. 107
Gas Boosters	No. 109
Four Bearing	No. 110
Blast Gates	No. 122
Technical Bulletin	No. 126

TURBO-COMPRESSORS

332-E

(*Continued from page* 174)

which developed a new principle of ramming sand into the mold. Through the course of their long association these two men also developed many other foundry machines. They organized the Beardsley & Piper Co. in 1918. During the 35 years of his foundry activity Mr. Piper visited hundreds of foundries in the United States and foreign countries, working with foundrymen in developing methods of conditioning and molding foundry sand.

° ° °

French E. Bassett, 51, manager of the Danville, Ill., plant, Saginaw Malleable Iron Division, General Motors Corp., died July 23 as the result of

FRENCH E. BASSETT

an automobile accident near Saginaw, Mich., while enroute from Detroit. Mr. Bassett joined the division at Saginaw in 1918 and and subsequently became production manager, and sales manager. In 1941 he was made defense co-ordinator of the division and had been plant manager at Danville since 1943.

° ° °

Paul D. Hunsinger, 58, superintendent, Ohio Pattern Works & Foundry Co., died July 9. Mr. Hunsinger, a native of Oxford, O., was graduated from Miami University. He moved to Cincinnati 36 years ago and had been associated with the pattern works for 30 years.

° ° °

Thomas A. Cuthill, 78, retired treasurer and one of the founders of H. C. Macaulay Foundry Co., Berkeley, Calif., died July 29, at his home in Berkeley.

° ° °

George W. Dolan, 46, chairman of the board of directors, Mathieson Chemical Corp., New York, died July 24, after a brief illness. Mr. Dolan, a native of Cleveland, was graduated from Western Reserve University in

(*Concluded on page* 178)

Electro

. . PLUSSES ENGINEERING FOR THE JOB WITH ENGINEERING AT THE JOB

THE same exacting standards that apply to engineering "Electro" High Speed Grinding Wheels to their jobs, apply to engineering every "Electro" product to its job. From this point, we follow through with job-side co-operation by our Qualified Field Engineers who have done so much to help the metal industries to speed production, raise quality and improve safety factors. Ask us for informative literature concerning products in which you are especially interested; or, better still, let us send without obligation, a Qualified Field Engineer to co-operate with you at Job-side. Here are some of our products for the Metal and Ceramic Industries:

ABRASIVE WHEELS, *resin-bonded, high-speed;* REFRACTORIES; CEMENTS, *high-temperature;* ALLOYS; STOPPER HEADS; FURNACE COVERS AND LININGS.

NON-FERROUS FOUNDRIES
Additive Alloys; CEMENTS; Grinding Wheels; Furnace Covers and Linings; Crucible and Pedestal Blocks.

STEEL MILLS & SMELTERS
Grinding Wheels; Stopper Heads; Brick; CEMENTS; Furnace Covers and Linings; Crucibles and Pedestal Blocks.

BRASS ROLLING MILLS
Door Assemblies; Furnace Covers and Linings; CEMENTS; Grinding Wheels; Crucibles and Pedestal Blocks.

FERROUS FOUNDRIES
(*Steel, Malleable, Cast-Iron*)
Stopper Heads; Grinding Wheels, *high-speed;* CEMENTS.

HEAT TREATING & ANNEALING
MUFFLES, box type; CEMENTS; Hearth Tile; Muffle Tile.

FOR CERAMIC INDUSTRIES
Kiln Furniture; CEMENTS; *high-speed* Grinding Wheels; Muffle Parts; Plate Setters; Posts; Slabs; Tubes—*Rigid, Floating or Combination Construction.*

INDUSTRIES SERVED: AUTOMOTIVE (*trucks, autos, tractors, airplanes*); CERAMIC; CHEMICAL; CONSTRUCTION; FOOD; MINING; RAILROADS; SEWAGE DISPOSAL PLANTS; SHIPBUILDING; WATER WORKS; UTILITIES; GOVERNMENTS (*Federal, State, Municipal, Navy Yards and Arsenals*).

Electro Refractories & Alloys Corporation

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Patent Applied for

THIS ISN'T THE "NEW LOOK" IN MODERN CONVEYING METHODS

This is strictly atmosphere for tourists. Real low-cost, high efficiency in material handling calls for Standard Conveyors . . . as sections, systems or portable powered units. Standard Conveyors are built to handle everything from metal bolts to cotton bales. They put manpower where it belongs—on the production line. To make substantial savings in your shop or warehouse, find out how Standard Conveyors can be used for all kinds of material handling, piling or moving. Standard Conveyor Co., General offices: North St. Paul 9, Minn. Sales and Service in Principal Cities.

FREE HELPFUL LITERATURE

Send for Standard's Catalog. See how conveyors are used in every field of industry. Ask for Bulletin No. F-98

Standard GRAVITY & POWER CONVEYORS

(*Concluded from page* 176)

1928. He joined the Mathieson organization in 1930 as a salesman and subsequently held various positions including those of assistant general sales manager, assistant to the president, and executive vice president. He was named president of the company in 1944 and became chairman of the board in April, 1948.

° ° °

H. Stanley Binns, 58, head of the metallurgical laboratory, Cincinnati Milling Machine Co., Cincinnati, died July 21. Mr. Binns became associated with the company while a student at University of Cincinnati. He was a member of the American Foundrymen's Society and the American Society for Metals.

° ° °

Walter E. Lough, 78, a representative of iron and steel casting foundries, with offices in New York, died July 26 in Muhlenberg Hospital, North Plainfield, N. J. Mr. Lough was born in Clinton, Ont., and had lived in North Plainfield for more than 50 years.

° ° °

Harry L. Chrismer, 78, who retired several months ago as foreman, American Car & Foundry Co., St. Louis, died July 6, in St. Joseph's Hospital, St. Charles, Mo. Mr. Chrismer had been associated with American Car & Foundry Co. for 63 years.

° ° °

Frederick A. Stevenson, 68, former president, American Car & Foundry Co., New York, who retired from active service with the company in 1947, died July 29. Mr. Stevenson had been associated with the company for more than 40 years.

° ° °

Edgar L. Stonewater, 59, until 3 years ago part owner Supreme Foundry & Mfg. Co., Belleville, Ill., died July 12 in Barnes Hospital, St. Louis, his native city, following an illness of two weeks.

° ° °

John Allison, chief engineer, Pittsburgh Steel Foundry Corp., Glassport, Pa., died July 8 at his home in Swissvale, Pa. Mr. Allison had been associated with the corporation for 42 years.

° ° °

Scott E. Rank, 60, superintendent, J. H. Day Co., Cincinnati, producers of gray iron, brass and aluminum castings, died there July 28.

Clipper Mfg. Co., 2800 Warwick, Kansas City 8, Mo., has opened a branch office at 422 Market St., San Francisco, with William E. Davis as district manager.

MOLDED TO PERFECTION!

Smith L-O Core Oil for all classes and sizes of cores...

Jobbing and production foundries—working with both ferrous and non-ferrous metals—find Smith L-O Core Oil the ideal binder for all classes of cores . . . regardless of their size or intricacy. This top-quality oil lends itself to easy workability with run of mine sand; comes in concentrated form to assure a ratio requiring a small volume of binder to a large batch of sand; is slow to air dry, thus allowing greater freedom of operation in the core room. Smith L-O Core Oil is a properly proportioned, thoroughly homogeneous mixture, for it is processed and controlled by the Dow-Therm method of heat treatment. In fact — it is the *only* core oil made by this patented method.

Get your requirements from the Smith representative nearest your foundry.

Smith L-O Core Oil

CORE WASH ROD DIP LIQUID PARTING

Smith L-O Core Oil

WAREHOUSE STOCKS AVAILABLE
In The Following Cities

- COLUMBIAN WAREHOUSE CO. — Reading, Pennsylvania
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- E. R. FROST CO. — Minneapolis, Minnesota
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- MALCOLM G. STEVENS — Arlington, Massachusetts
- TERMINAL WAREHOUSE — Worcester 8, Massachusetts
- TOMKINS TIDEWATER TERMINAL — South Kearny, New Jersey
- M. W. WARREN COKE CO. — St. Louis, Mo.
- WESTERN FOUNDRY SAND CO. — Seattle, Washington
- WESTERN INDUSTRIAL SUPPLY CO. — Portland 14, Oregon

SMITH OIL & REFINING CO.
INDUSTRIAL OILS DIVISION . . . ROCKFORD, ILLINOIS

INDUSTRY Briefs

STERLING Steel Foundry Co., Braddock, Pa., manufacturer of steel castings and ingots has been purchased by associated industrial members of Frozen Foods Institute Inc., New York, for approximately $500,000. The institute plans a $2 million rehabilitation and expansion program. Sterling's backlog of orders will be filled, but future orders will be limited to associate industrial members of the institute at prices based on production costs.

° ° °

Wysong & Miles Co., Greensboro, N. C., has begun construction of a modern foundry for production of semi-steel, brass and aluminum castings used in the manufacture of its line of sheet metal machinery. The foundry which will cost around $100,000, will contain 20,000 sq ft of floor space. Officers of the company, which was incorporated in 1903, include: Russell F. Hall, president; W. R. Kime, vice president and general manager; W. A. Balsley, vice president; Russell F. Hall Jr., secretary; E. K. Patterson, treasurer; J. O. Weisner, plant superintendent; Orville C. Hoover, superintendent of new foundry, and Ralph Weisner, chief engineer.

° ° °

Foxboro Co., Foxboro, Mass., has acquired additional space for its sales office and warehouse at 266 Fremont St., San Francisco. That branch also is a branch factory, providing repair service to users of industrial instruments in the West Coast area and headquarters for Harry B. Brooks, manager of the company's Pacific district.

° ° °

Koppers Co., Koppers Bldg., Pittsburgh 19, has consolidated the former Shops Division, 200 Scott St., Baltimore, and the former Piston Ring Division, Bush & Hamburg Sts., Baltimore, to form a new Metal Products Division. Manufacturing activities will continue to be carried on in Baltimore under the direction of Walter F. Perkins, vice president and general manager.

° ° °

Howard Foundry Co., Chicago, has acquired the magnesium foundry in Belmont, Calif., formerly owned by Dalmo-Victor, San Francisco. The plant manufactured magnesium incendiary bombs and magnesium aircraft castings used during the war. The Howard organization now has 6 foundries located in Chicago, Los Angeles and Belmont, Calif.

° ° °

Lester-Phoenix Inc., 2711 Church Ave., Cleveland, producer of die casting and injection molding machines, has appointed the newly formed Seaboard Machinery Co., 3212 East Olympic Blvd., Los Angeles, as its representative in that area. Partners in the Seaboard Machinery Co. are William J. Hennessy, Jack W. Ditewig and Richard H. Priest.

° ° °

Electric Steel Foundry of Oregon Inc., 2141 25th Ave. N.W., Portland, Oreg., has been granted a 10-year charter of incorporation. Authorized capital stock was listed at $250,000. Company maintains an office at 1920 Lorraine St., Houston, Tex., with William R. Rice as agent.

° ° °

Hoosier Iron Works Inc., West Morgan & Webster Sts., Kokomo, Ind., has completed an extensive building and enlarging program, including a 100 x 150-ft building for cleaning and grinding and a 50 x 100-ft building designed for heat treating.

° ° °

Standard Fuel Engineering Co., 667 Post Ave., South, Detroit 17, has completed modernizing the dust collecting system of its Zero Refractory Division. This is one step in the company's program of increasing production capacity and improving plant conditions.

° ° °

Edward Valves Inc., 1200 West 145th St., East Chicago, Ind., is constructing a new building to house its metallurgical, physical and chemical laboratories. The facilities will be used for research and development work on Edward and Nordstrom steel valves.

° ° °

Woodman Machine Co. Inc., 1103 Third St., Eureka, Calif., recently was formed with capital of $100,000 to engage in a general machine shop and foundry business. Principals are Douglas G. Merrill and Julian D. Brown of Eureka.

° ° °

Federated Metals Division of American Smelting & Refining Co., has moved its New England office from 250 Stuart St., Boston, to the Statler Office Bldg., 20 Providence St., Boston 16. Telephone numbers remain the same.

° ° °

E. F. Houghton & Co. of Canada Ltd., has begun operations in its new plant at 100 Symes Rd., Toronto.

(*Continued on page* 182)

BUILDING ADDITION: Stearns Magnetic Mfg. Co., manufacturers of magnetic separators, pulleys, drums, concentrators, lifting magnets, clutches and brakes, has moved into a modern addition to its Milwaukee plant. Ground floor of the new building is devoted to an enlarged, fully equipped laboratory designed for research and material testing. General and executive offices with space for engineering are housed on the second floor. Visitors will be received in a solid glass front lobby with specially designed indirect lighting fixtures, custom built matching furniture and a glass paneled receptionist office at the left of the patio type interior. A mural that illustrates uses of the company's magnetic products covers the entire west wall

Melts so fast

There's no time for OXIDATION

You get really clean melts—and save expensive alloying elements with Ajax-Northrup melting! One user melts nickel steels at half the cost of other methods due to savings in deoxidizers and constituents. Control is ideal—hits temperatures "on the nose." Carbon contamination is nil—good for stainless steels where carbon content should be held below 0.08% or even as low as 0.015%! Ideal for tough-to-control non-ferrous metals, and rare metals, too. May we send you our latest bulletins?

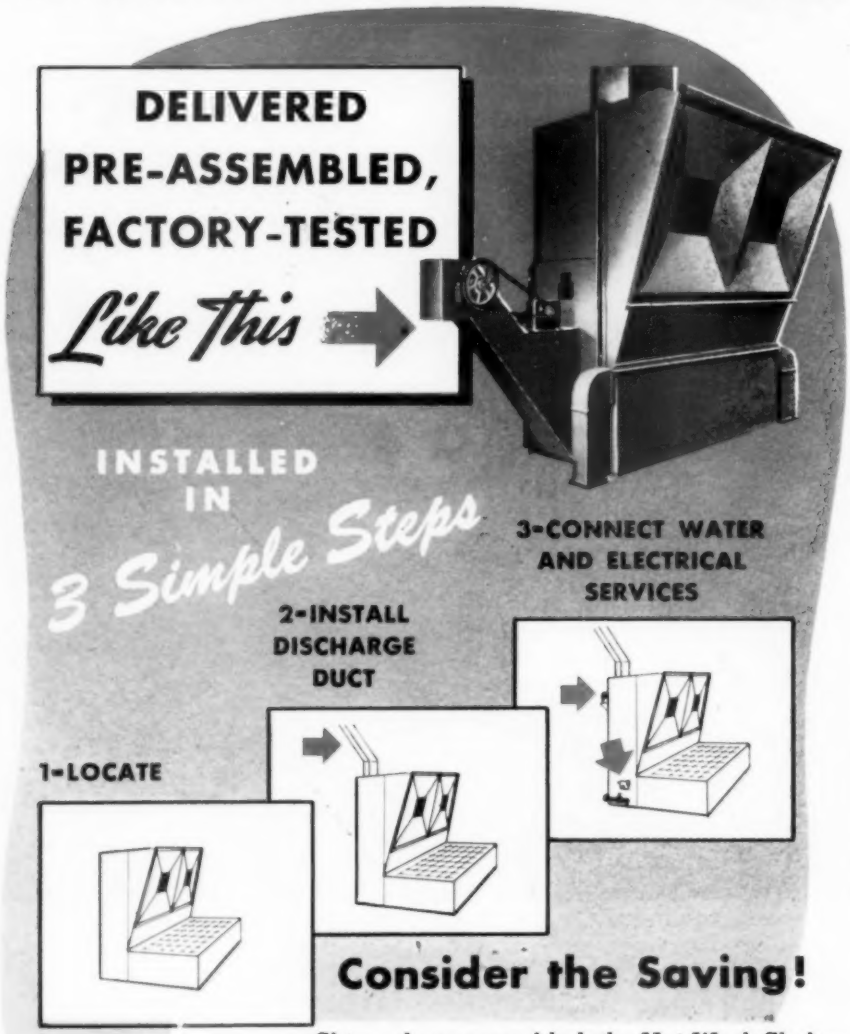
ALL STEELS AND NON-FERROUS METALS
8 oz. to 8 tons

AJAX ELECTROTHERMIC CORPORATION
AJAX PARK, TRENTON 5, N. J.
Associate Companies
THE AJAX METAL COMPANY • AJAX ELECTRIC FURNACE CORPORATION
AJAX ELECTRIC COMPANY, INC. • AJAX ENGINEERING CORPORATION

SINCE 1916

AJAX NORTHRUP
HEATING & MELTING

The UNI-WASH SHAKE-OUT BOOTH



Consider the Saving!

Shipped pre-assembled, the Uni-Wash Shake-Out Booth not only saves erection time but also permits a factory test on each unit prior to shipment, thus assuring peak performance. And, added to installation savings, the initial price of these units is lower than that for any system of comparable capacity.

The Uni-Wash Shake-Out Booth is a compact, packaged dust arresting system. It collects dust-laden air, water washes it by the patented Uni-Wash process, drys it, then exhausts it. Available in five standard sizes—5000, 7500, 10,000, 12,500 and 15,000 CFM.—these units may be used individually or in combination to cope with any dust condition resulting from shake-out, core knock-out, shaker screening, sand transfer, mold conveyor and pouring operations.

SEND FOR ILLUSTRATED CATALOG WHICH CONTAINS COMPLETE DETAILS.

Established 1912

NEWCOMB-DETROIT COMPANY

Main Office and Plant
5741 Russell Street
DETROIT 11, MICHIGAN

Grand Rapids Division—Plant
GRAND RAPIDS, MICH.

Western Sales Office
CHICAGO, Ill.

(*Continued from page* 180)

under the direction of E. H. MacInnis, vice president and director of sales. Plant will specialize in the manufacture of carburizers, quenching oils, cutting oils, heat treating salts and drawing compounds.

* * *

Equipment from the B & B Foundry, Indianapolis, has been moved to the Muncie Aluminum Foundry Co. Inc., Muncie, Ind., following a merger of the two foundries. Clay Bush, owner of both companies will maintain a business office in Indianapolis.

* * *

Frank Collins and Associates, former operators of a gray iron foundry in Tipton, Ind., have purchased the L & O Foundry, Elwood, Ind., from L. Whitehead. Mr. Whitehead now is employed at the Lavelle Foundries, Anderson, Ind.

* * *

Meehanite Metal Corp., Pershing Square Bldg., New Rochelle, N. Y., has closed contracts for the manufacture of Meehanite castings with Pesce & Simeone, S. A. Montevideo, Uruguay, and Metallurgica Wallig, S. A., Porto Alegre, Brazil.

* * *

Hahn Equipment Corp. (formerly Hahn Engineering Co.) 30 Church St., New York, has merged with Pitz Foundry Inc., 286 Scholes St., Brooklyn 6, N. Y. New corporate name is Hahn-Pitz Corp., and the main office will be at the Brooklyn address.

* * *

Majority of stockholders of Universal Engineering Corp., Cedar Rapids, Iowa, has approved sale of the business to Pettibone Mulliken Corp., Chicago. The former is one of the oldest and largest manufacturers of crushers, pulverizers and conveyors.

* * *

Rust Furnace Co., 1000 Clark Bldg., Pittsburgh 22, is designing and will build a car-type furnace for heat treatment of complex pipe assemblies for Pittsburgh Piping & Equipment Co., Ten 43rd St., Pittsburgh 1.

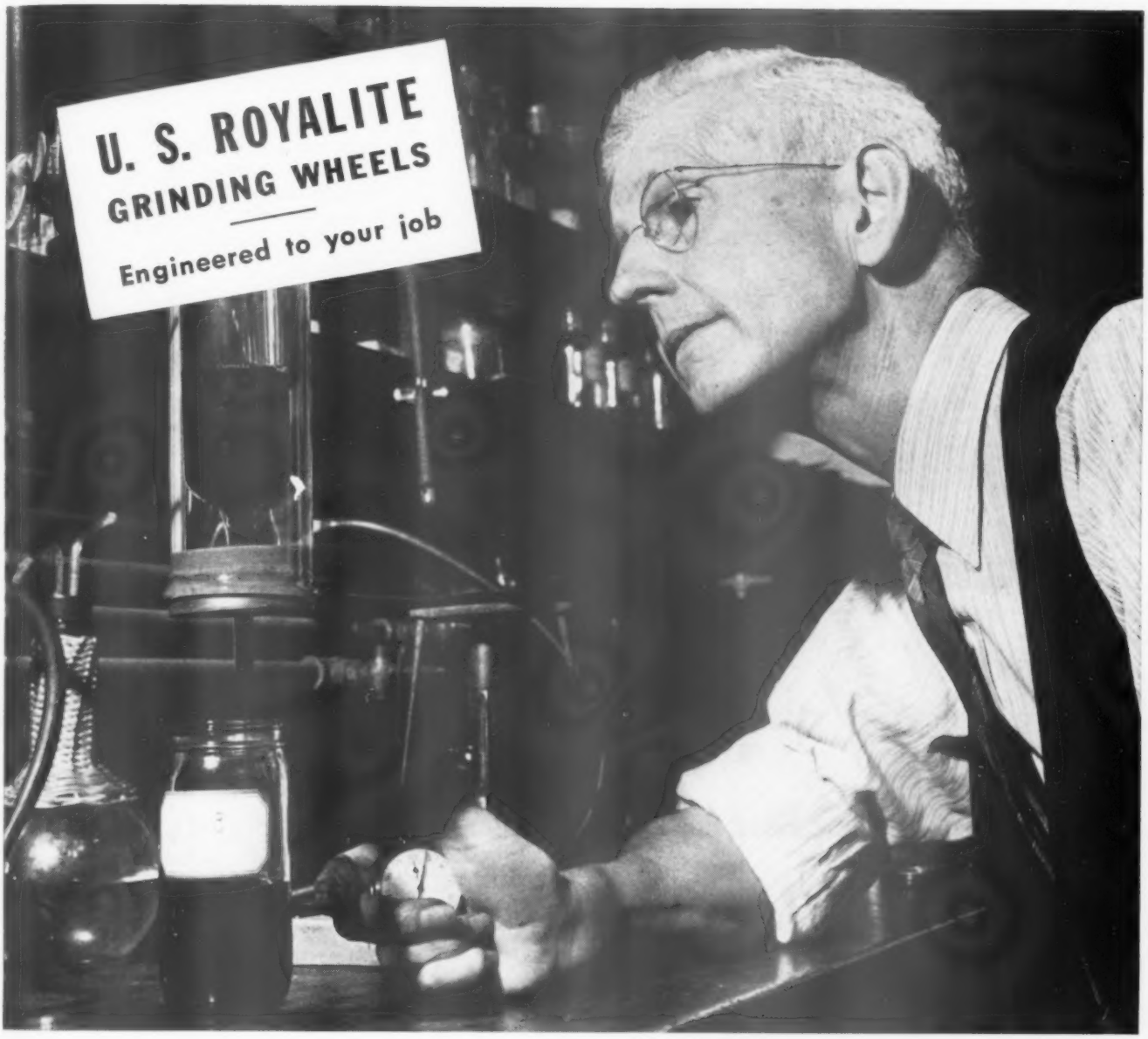
* * *

M. Hertenstein & Co., 1409 South High St., Columbus 7, O., suffered fire damage June 11 estimated at $150,000. Coreroom, grinding department, pattern shop, storeroom, shipping room and a laboratory were gutted.

* * *

Federated Metals Division, American Smelting & Refining Co., New York, has put into operation a new production unit at 9000 Market Street Rd., Houston, Tex. That plant will

(*Concluded on page* 184)



An old timer talks about Grinding Wheels...

You're looking at a test of the kinetic viscosity of liquid resin—one of many tests made to be sure you get a grinding wheel that is just what you've asked for . . . and more.

The purpose is always the same—*more production at lower cost*. We draw from our immense research facilities in every conceivable phase of abrasives and bonds. In addition, we have at our disposal the vast research data covered by the thousands of other products made by United States Rubber Company.

That is why we can deliver U. S. Royalite Grinding Wheels that are precisely engineered to your job, whether you're snagging castings, grinding ball races or working with billets, bits, slabs or sauce-pans. We can give you accurate grinding wheel costs in advance—by means of thorough field tests made by our engineers right in your own plant.

For more information, write United States Rubber Company, Grinding Wheel Dept., Fort Wayne 4, Indiana.

U. S. GRINDING WHEELS—ORIGINATED IN 1863

PRODUCTS OF

U.S.RUBBER

SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

North • East • South • West . . . It's Schramm

. . . doing jobs like these in Your Field

At almost every turn you need compressed air!

The check list (at right) indicates some of the many compressed air jobs to be done, all of which are accomplished easily, quickly and economically with Schramm Air Compressors.

Here's *why* you profit, as others have, by using Schramm: they're compact, lightweight, easy to start; built for rugged jobs, to provide a continuous flow of air.

Important features include 100% water cooled; mechanical intake valve; forced feed lubrication and easy, electric push-button starting.

Performance everywhere has proved Schramm Air Compressors can do any compressed air job you require. Write today for list of models and sizes.

- Air Hoists, Lifts and Motors
- Core Breaking
- Drilling Salamanders
- Cleaning Castings
- Operating Molding Machines
- Applying Core Paste
- Paving Breakers for Removing Slag from Blast and Reverberating Furnaces
- Pneumatic Hammers and Drills
- Tapping Blast Furnaces
- Wire Brush Cleaning Castings
- Grinding Billets and Castings
- Pneumatic Sand Sifter
- Aerating Metal in Bessemer Process
- Blowing Out Cores
- Chipping Castings and Billets

SCHRAMM INC.

THE COMPRESSOR PEOPLE • WEST CHESTER • PENNSYLVANIA

(*Concluded from page* 182)

manufacture solders, bearing metals, battery metals, lead ingot, type metals, and special white metal alloys.

° ° °

Chain Belt Co., Milwaukee, has opened a new district sales office at 2900 West Clay St., Richmond 21, Va. Fred W. Taylor, who was associated with the company for 10 years prior to 1946, has been named district manager of the Richmond office.

° ° °

Baltimore Foundry & Machine Corp., 1901 South Charles St., Baltimore 10, has transferred its sales headquarters to the firm's parent organization, McConway & Torley Corp., 48th St. and Allegheny Valley Railroad, Pittsburgh 1.

° ° °

Fire destroyed the plant of Vulcan Steel Foundry, 2934 Ford St., Oakland 1, July 8. Frank J. Dennis, manager of the foundry, estimated the foundry loss at $150,000 involving destruction of valuable electrical equipment.

° ° °

Warren Foundry & Machine Co., 5865 Wilmington Ave., Los Angeles 1, has obtained building permit for construction of a nonferrous foundry building at 8680 Otis St., South Gate, Calif., at a cost of $20,000.

° ° °

Bedford Tool & Forge Co., 22 Interstate St., Bedford, O., has appointed Tom Brown Inc., 36th St. & Allegheny Valley Railroad, Pittsburgh, as southwestern Pennsylvania distributor.

° ° °

Josam Products Foundry Co., U. S. Highway 12, Michigan City, Ind., is completing extensive additions to its plant, including a new cupola building, coke and sand storage buildings.

° ° °

James J. Lacy Co., Block, Wills & Philpot Sts., Baltimore, engaged in casting ferrous and nonferrous metals, is erecting a 54 x 60-ft addition to its coreroom.

° ° °

Jeffrey Mfg. Co., 907 North Fourth St., Columbus 16, O., has purchased the capital stock of the Case Crane & Kilbourne Jacobs Co., Fourth & Lincoln Sts., Columbus 16.

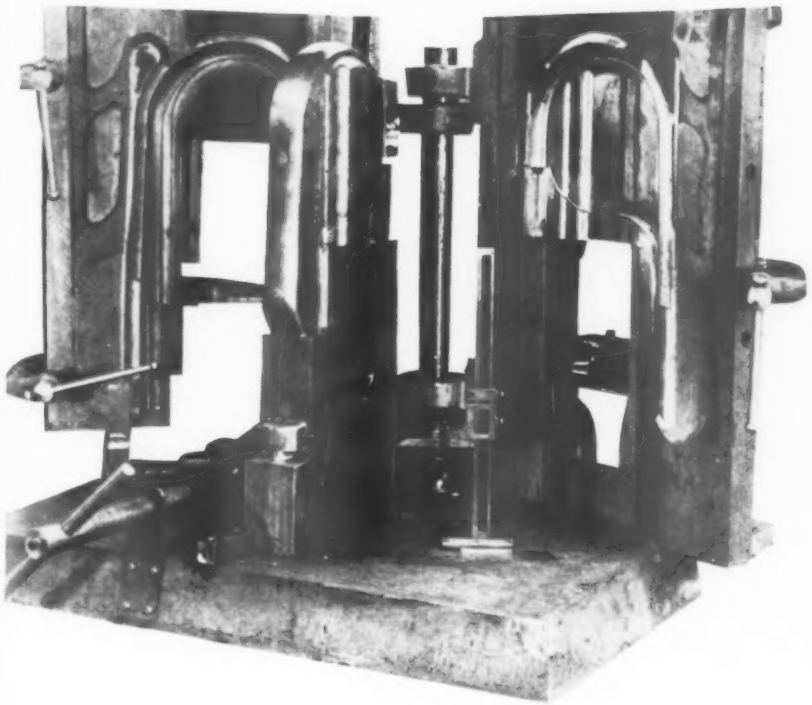
° ° °

A. Kilpatrick & Sons Foundry Co., 625 East Carrie Ave., St. Louis, suffered an estimated $35,000 damage in a fire July 1.

° ° °

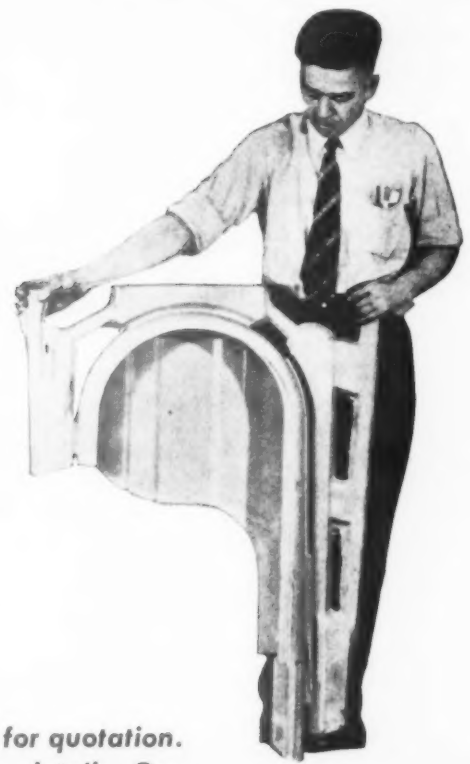
General Electric Company, Schenectady 5, N. Y., has moved its Welding Equipment Divisions to Fitchburg, Mass.

Accuracy and quality really count!



ONLY ACCURATE AND PROPERLY CONSTRUCTED MOLDS CAN GIVE YOU QUALITY CASTINGS AT GREATER ECONOMY.

The 30# saw head casting shown below is being produced from this mold at a rate of one every seven minutes.



This method of making aluminum castings is rapidly becoming more popular because it is based on three sound economic reasons. Aluminum castings produced in permanent molds are cleaner and better looking; they have a closer dimensional accuracy; they can be produced more economically.

Manually operated molds and pneumatic molds (not illustrated) are adaptable to practically all production aluminum castings. Modernize your equipment by converting to permanent molds and using our pneumatic draw tables.

Send us your blueprints or sample castings for quotation. If you wish, write or phone us for further details. Our telephone number is MAin 2035.

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1315 MAIN AVENUE — CLEVELAND 13, OHIO

DESIGNERS AND MANUFACTURERS OF PERMANENT MOLDS, WOOD AND METAL PATTERNS AND MODELS

FOUNDRY STATISTICS

Index of Foundry Equipment Orders

Foundry Trades Only

(Net Orders Closed, New Equipment)

	1947	1948
Jan.	466.9	380.9
Feb.	472.5	367.3
Mar.	532.3	326.2
Apr.	445.9	412.0
May	525.9	388.5
June	658.9	376.8
July	426.1	....
Aug.	411.3	....
Sept.	393.1	....
Oct.	438.2	....
Nov.	286.1	....
Dec.	467.8	....

Note: Figures are percentages of the base period 1937-1939 taken as 100 per cent (monthly average). Source: Foundry Equipment Manufacturers Association.

Estimated Number of Foundry Production Workers

Type Foundry	Apr. 1948	Mar. 1948	Apr. 1947
Gray Iron	110,700	113,900	116,400
Malleable Iron	37,200	37,900	34,300
Steel	68,600	69,300	66,300

Source: Bureau of Labor Statistics. Estimates adjusted to Federal Security Agency data through 1945.

Castings Production

In Philadelphia Federal Reserve District

(June, 1948)

Type	Percentage Change From:	
Foundry	May, 1948	June, 1947
Gray Iron	+ 9.3	+ 7.4
Malleable Iron	+25.6	+110.6
Steel	−10.2	+ 18.0
Nonferrous	+ 2.4	+ 17.2

Source: University of Pennsylvania.

Average Earnings and Hours of Foundry Workers

Type	Average Weekly Earnings			Average Weekly Hours		
Foundry	Apr. 1948	Mar. 1948	Feb. 1948	Apr. 1948	Mar. 1948	Feb. 1948
Gray Iron	$56.39	$58.47	$57.24	40.2	41.8	41.2
Malleable Iron	56.77	57.79	57.44	39.8	40.8	40.8
Steel	60.13	59.88	58.52	41.2	41.3	40.5

Source: Bureau of Labor Statistics.

—SHIPMENTS OF CASTINGS—

(Reported by Bureau of the Census)

Gray Iron Castings

(Net tons)

	Shipments—Total	Shipments—For Sale	Unfilled *Orders
1946			
TOTAL	10,269,657	6,102,246	.....
1947			
Jan.	1,077,820	632,789	3,021,141
Feb.	1,009,970	583,252	2,986,741
Mar.	1,089,828	633,844	2,979,326
Apr.	1,097,150	636,708	2,907,694
May	1,097,307	636,013	2,782,706
June	1,038,356	596,874	2,710,854
July	912,939	519,137	2,675,138
Aug.	951,859	550,961	2,631,273
Sept.	1,025,089	590,702	2,679,858
Oct.	1,154,192	654,426	2,668,781
Nov.	1,020,239	561,660	2,687,244
Dec.	1,066,211	587,933	2,782,236
TOTAL	12,540,960	7,181,299	.....
1948			
Jan.	1,064,335	584,238	2,802,685
Feb.	1,024,450	571,406	2,769,408
Mar.	1,169,085	659,821	2,726,415
Apr.	1,051,083	584,969	2,690,893
May	992,692	555,728	2,601,626

* For sale only.

Steel Castings

(Net tons)

	Shipments—Total	Shipments—For Sale	Unfilled *Orders
1946			
TOTAL	1,432,049	1,043,358	.....
1947			
Jan.	139,029	101,140	365,476
Feb.	125,612	92,822	421,405
Mar.	134,909	99,701	434,865
Apr.	144,175	106,127	427,554
May	140,874	103,779	443,225
June	139,031	103,888	445,475
July	116,956	85,014	473,923
Aug.	120,405	88,719	478,649
Sept.	137,457	102,913	526,229
Oct.	148,358	111,288	497,344
Nov.	130,125	97,143	493,309
Dec.	148,124	110,970	489,364
TOTAL	1,625,055	1,203,504	.....
1948			
Jan.	141,068	108,282	491,745
Feb.	142,434	107,762	497,097
Mar.	162,891	125,550	508,822
Apr.	150,305	114,896	472,370
May	143,337	111,616	482,531

* For sale only.

Malleable Iron Castings

(Net tons)

	Shipments—Total	Shipments—For Sale	Unfilled *Orders
1946			
TOTAL	752,028	452,355	.....
1947			
Jan.	75,898	42,414	259,764
Feb.	74,716	41,684	274,018
Mar.	76,614	43,488	280,724
Apr.	81,890	47,303	275,415
May	75,478	42,294	262,117
June	78,524	45,291	248,798
July	64,162	40,733	234,656
Aug.	62,404	38,165	229,735
Sept.	71,568	40,138	218,276
Oct.	83,979	47,673	210,695
Nov.	72,111	39,969	206,510
Dec.	77,757	44,042	202,408
TOTAL	895,054	513,228	.....
1948			
Jan.	77,744	45,808	205,759
Feb.	75,194	42,582	209,447
Mar.	86,767	50,017	203,351
Apr.	80,602	45,941	199,578
May	76,079	42,261	191,553

* For sale only.

Aluminum Castings

(Thousands of pounds)

	Shipments—Total	Shipments—Sand	Shipments—Perm. Mold	Unfilled *Orders
1946				
TOTAL	388,711	160,845	153,138	.....
1947				
Jan.	39,438	14,030	16,902	131,368
Feb.	35,904	12,936	15,148	128,999
Mar.	40,135	13,791	17,509	121,038
Apr.	39,438	13,633	16,605	112,926
May	37,400	13,646	14,514	112,548
June	32,986	11,775	13,105	102,758
July	30,197	10,095	11,739	101,370
Aug.	30,441	10,908	11,342	94,658
Sept.	35,877	12,228	14,146	94,637
Oct.	40,532	13,855	15,685	85,012
Nov.	34,683	11,428	13,558	83,975
Dec.	37,489	12,552	13,784	81,784
TOTAL	441,996	155,112	174,515	.....
1948				
Jan.	37,889	12,670	15,020	86,176
Feb.	37,963	12,177	15,055	88,032
Mar.	41,794	13,343	16,258	78,344
Apr.	38,269	12,407	14,563	78,499
May	33,868	11,854	12,351	75,219

* For sale only.

Copper-base Alloy Castings

(Thousands of pounds)

	Shipments—Total	Shipments—Sand	Shipments—Perm. Mold	Unfilled *Orders
1946				
TOTAL	898,952	832,037	26,520	.....
1947†				
Jan.	85,783	80,524	2,164	78,874
Feb.	78,729	73,863	2,046	76,016
Mar.	83,195	77,113	2,623	74,422
Apr.	84,196	78,760	2,253	69,392
May	90,054	81,851	4,732	73,550
June	84,604	77,402	3,829	67,119
July	70,603	64,686	3,284	70,002
Aug.	75,060	68,271	4,021	68,659
Sept.	83,158	75,728	3,976	69,919
Oct.	92,119	83,592	4,763	67,280
Nov.	81,803	74,274	3,773	73,851
Dec.	87,215	79,495	4,393	74,814
TOTAL	1,051,742	960,732	51,139	.....
1948†				
Jan.	85,432	77,433	4,593	74,579
Feb.	87,169	79,329	4,509	71,143
Mar.	96,344	87,249	5,261	70,544
Apr.	89,035	80,426	4,705	70,726
May	81,286	72,982	4,910	65,818

* For sale only.

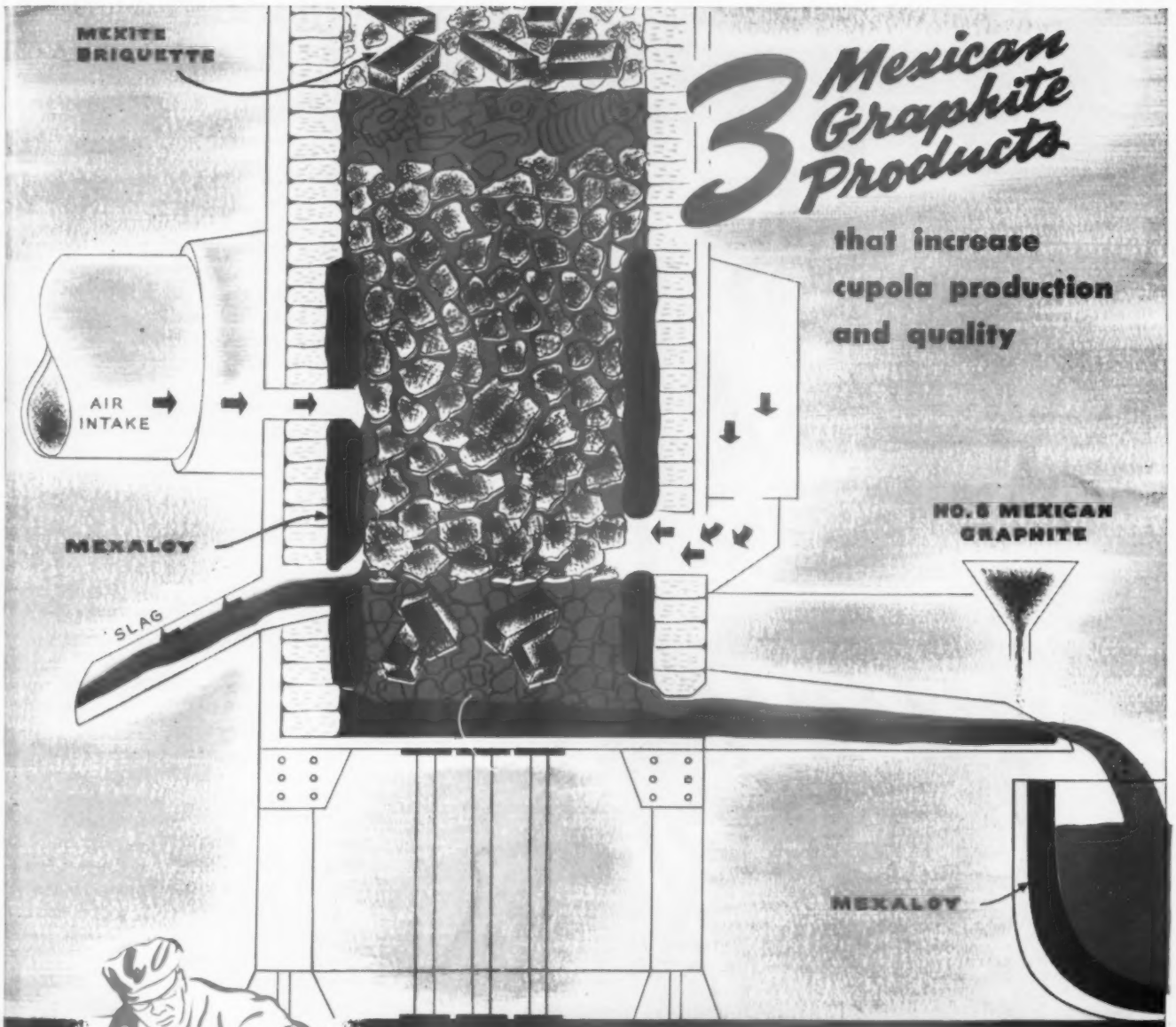
† 1947 and 1948 figures include copper and copper-base alloy castings.

Magnesium Castings

(Thousands of pounds)

	Shipments—Total	Shipments—Sand	Shipments—Perm. Mold	Unfilled *Orders
1946				
TOTAL	8,472	7,149	532	....
1947				
Jan.	809	723	40	4,480
Feb.	707	605	69	3,776
Mar.	677	593	45	3,276
Apr.	627	526	78	3,245
May	628	481	104	3,297
June	613	476	93	3,183
July	492	372	67	2,772
Aug.	523	382	83	3,267
Sept.	518	421	56	2,747
Oct.	616	557	21	2,659
Nov.	602	540	31	2,808
Dec.	669	586	39	2,730
TOTAL	7,693	6,404	729	....
1948				
Jan.	659	592	...	2,701
Feb.	655	566	...	2,866
Mar.	704	645	...	2,741
Apr.	673	588	...	2,640
May	622	540	...	2,673

* For sale only.



3 Mexican Graphite Products

that increase cupola production and quality

MEXITE BRIQUETTES. One 4-lb. Mexite Briquette provides the same carbon content as 50 lbs. of pig iron when introduced into the cupola charge. Not only do Mexite briquettes sharply reduce melting costs per ton; they also reduce the range of carbon content fluctuation and give a steadier carbon analysis, a particularly vital factor when high percentages of steel are charged.

MEXALOY, applied to cupola linings, ladles, and spouts, resists molten metal and slag and keeps metal free from refractory inclusions. Its natural lubricating action provides low friction surfaces which part easily from metal and slag. A Mexaloy mixture is easily applied to any clean surface. Because it will not melt or change character under intense heat, Mexaloy gives longer refractory life with lower maintenance cost.

NO. 8 MEXICAN GRAPHITE is used for ladle additions to treat grey cast iron. Trickled into the cupola spout as metal falls into the ladle or with a direct ladle addition, it greatly reduces chill and hardness, producing castings of increased machineability. Normally only 2 lbs. of No. 8 need be added per ton of molten metal—a cost of only ten cents per ton—to assure castings which require no annealing. Write today for complete information on how Mexite Briquettes, Mexaloy, and No. 8 Mexican Graphite will give you better castings for less money.

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Howell Works—Howell, Michigan

INVESTMENT CASTING AT INTERNATIONAL NICKEL COMPANY

(*Continued from page* 99)

sprayed on just prior to casting each wax pattern. The mold is clamped into the machine and a lever is moved. Wax at the proper temperature is injected automatically into the mold by a hydraulically operated ram from a container attached to each machine where temperature is kept constant and the wax is agitated continuously to insure uniform wax temperature throughout the batch. While waiting the few moments for the wax to set, the operator prepares another mold for insertion in the machine.

Use Refrigerating Unit

Each wax injection machine is equipped with a ¼-ton capacity refrigerating unit which is connected to the lower or fixed master mold clamping plate. This plate is a Monel casting containing, internally, 8 ft of nickel tubing through which the refrigerant is pumped. Plate temperatures can be controlled as low as 30° F. Refrigeration is made necessary by the repeated injection of hot wax into the master mold which causes the mold to overheat. Overheating makes the injection wax slower to cool and introduces undesirable wax shrinkage and dimensional control problems. By refrigerating the clamping plate, the heat transfer rate of the master mold can be automatically controlled, thus avoiding these difficulties and enabling the operator to maintain a uniform and efficient injection cycle.

In making wax patterns for an aircraft engine exhaust fitting at this plant an ordinary investment wax is mixed with a small percentage of rubber. The rubber is used to give the wax a certain amount of resiliency to avoid damage to the pattern during handling. A small degree of accuracy and fineness in detail of the pattern is lost by the use of this type wax, thus it is suitable only for certain types of castings. This wax is black in color and is cast at 142° F and, in the case of these exhaust fittings, at 500 psi.

Nozzle partitions and compressor blades are also made at the plant. These blades are being cast in a very high strength alloy difficult to machine. Consequently every effort is made to produce an extremely accurate wax pattern. The wax used in this instance hardens into a brittle pattern requiring greater care in

(*Continued on page* 190)

right on the "button"

KEOKUK... *ABSOLUTE ACCURACY IN PERCENTAGES OF SILICON, IRON AND ALLOYS*

STEEL PLANTS—60-pound Keokuk Electro-Silvery Pigs for blocking the open hearth heat. For equal distribution of silicon and best temperature meltdown. Handle by magnet.

FOUNDRIES—30-pound Keokuk Electro-Silvery Pigs for charging mechanically or by hand into the cupola. Easily broken into two or more pieces, handled by magnet and measured by weight. Regular or alloy analysis.

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CRUCIBLE MANUFACTURERS ASSOCIATION

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(*Continued from page* 188)

handling. Such a wax provides more accuracy and a greater degree of fineness of detail. The wax is tan in color and injected at 183° F and 400 psi.

The wax pattern is removed from the mold and sent to the assembly table where it is mounted on a wax sprue. One or many patterns may be mounted on a single sprue, depending upon size. The sprue forms an outlet for the wax when it is melted out and provides an inlet for the molten metal when the casting is poured. Figs. 4, 5 and 6 illustrate these operations.

Patterns are cemented on the sprue with wax of a lower melting point and of different color than that of the pattern. It is applied with small metal tools heated in a bunsen burner flame. Use of a lower melting point wax reduces possibility of damaging the pattern with the hot wax or hot tool. The different colors permit the assembler to see at a glance where she has worked and to check that all joints which should be cemented are properly processed.

Work in Air Conditioned Room

Wax patterns are produced, assembled on sprues, and held until used, in the air-conditioned room described previously. Atmospheric impurities and incorrect temperature or humidity can affect the tolerances and accuracy required for the reproduction of the highly complicated shapes in the finished castings. The slightest deviation in the wax pattern, which might not be visible to the naked eye at this stage of production, could cause rejection of the casting at the end of a long and expensive series of operations.

Next step is dip coating. Technically, this coating is referred to as "primary investment." A special type of silica-base, quick drying material—much like liquid plaster of paris in appearance—is applied to the mold and sprue assembly by hand dipping as shown in Fig. 7. Excess material is shaken off the patterns laid on a rack to dry. The material dries with an exceptionally smooth surface next to the wax assembly. When the casting finally is made it is this coating which gives the metal its smooth surface.

While the dip-coated surface is still wet, fine grained sand (Fig. 8) is applied. This gives a roughness to the outer surface which helps it adhere to the secondary investment material.

The sprue and pattern assembly is then tacked to a steel bottom plate with a quick hardening wax. An Inconel flask, lined with heavy,

(*Continued on page* 193)

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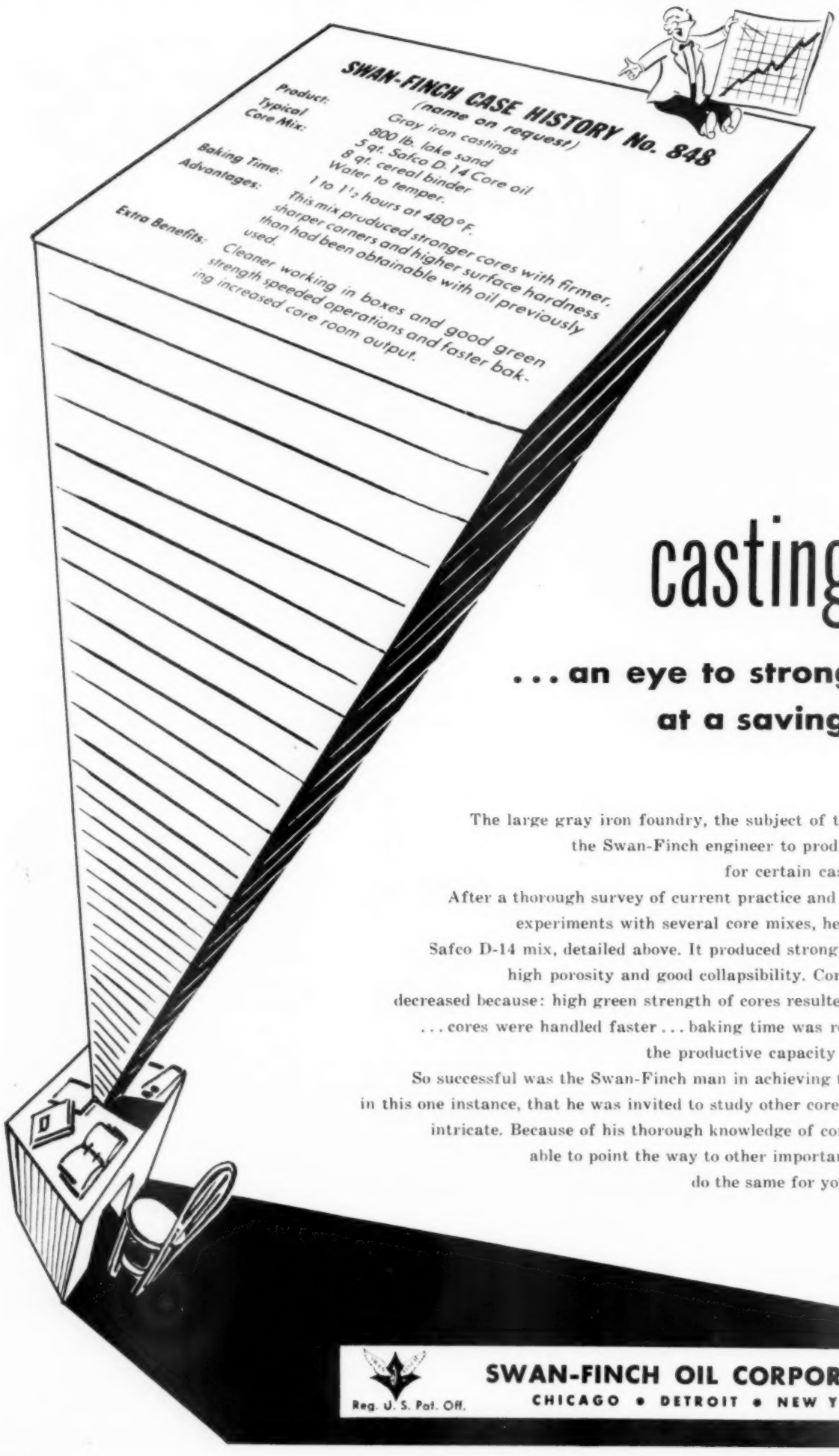
SWAN-FINCH CASE HISTORY No. 848
(name on request)
Product:
Typical Core Mix:
Gray iron castings
800 lb. lake sand
5 qt. Safco D-14 Core oil
8 qt. cereal binder
Water to temper.
Baking Time:
1 to 1½ hours at 480°F.
Advantages:
This mix produced stronger cores with firmer, sharper corners and higher surface hardness than had been obtainable with oil previously used.
Extra Benefits:
Cleaner working in boxes and good green strength speeded operations and faster baking increased core room output.

casting

. . . an eye to stronger cores at a saving

The large gray iron foundry, the subject of this file, challenged the Swan-Finch engineer to produce stronger cores for certain castings at less cost.

After a thorough survey of current practice and requirements, and experiments with several core mixes, he recommended the Safco D-14 mix, detailed above. It produced strong, accurate cores of high porosity and good collapsibility. Core room costs were decreased because: high green strength of cores resulted in less breakage . . . cores were handled faster . . . baking time was reduced, increasing the productive capacity of the core ovens.

So successful was the Swan-Finch man in achieving the desired results in this one instance, that he was invited to study other cores, both simple and intricate. Because of his thorough knowledge of core making, he was able to point the way to other important savings. He can do the same for you. Ask him to call.

Reg. U. S. Pat. Off.

SWAN-FINCH OIL CORPORATION

CHICAGO • DETROIT • NEW YORK

(*Continued from page* 190)

waxed paper and open at both ends, is placed over the assembly and likewise sealed to the bottom plate by quick hardening wax. Fig. 9 illustrates this operation. That portion of the paper extending above the flask and containing only excess investment material is later trimmed off. The paper remaining in the flask is burned out during subsequent operations.

Dry investment material is mixed with a liquid binder until it attains the consistency of "concrete soup." This is poured into the flask, now closed at the bottom by the bottom plate. The flask and contents are then sent to a jolting table for approximately one hour, during which time the investment material is jolt-packed around the wax assembly (Figs. 10 and 11).

Material Hardens Rapidly

The investment material hardens rapidly and after the excess paper and investment are removed by hand sawing, the invested flask is sent to a gas dewaxing oven for approximately 8 hours. In this oven, at carefully controlled temperatures ranging up to 250° F, the sprue and pattern assembly is melted out. (Figs. 12 and 13). The wax is caught in pans resembling large scale models of the housewife's oven drip pans.

The flask is then charged into a preheat furnace (Fig. 14) where it is slowly brought to the proper temperature, 1300 to 1800° F depending on size, for approximately 12 hours, prior to receiving its charge of metal. In this furnace the last trace of wax is volatilized and the investment material fully hardened. The heating cycle is carefully controlled.

While the mold is receiving its final minutes of baking, the particular charge of metal to be used for the casting is melted in an electric arc or an induction furnace. There are six electric arc furnaces at Bayonne of 10 lb capacity each, and one electric induction furnace with a capacity up to 150 lb, as shown in Figs. 15 and 16.

The metal is checked for the correct pouring temperature with an optical pyrometer. In the case of the high-nickel alloys this temperature ranges from 2500 to 3150° F. If the small arc furnaces are used, the flask is removed from the oven and clamped on top of the furnace which is on trunnions to allow for 180-degree rotation. The furnace is turned upside down (Fig. 17) and air at 3 to 5 psi is introduced to supplement gravity feeding. In larger castings where the induction is used, the metal is poured by gravity (Fig. 21).

(*Continued on page* 196)

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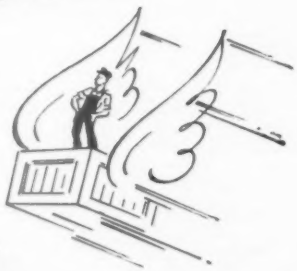

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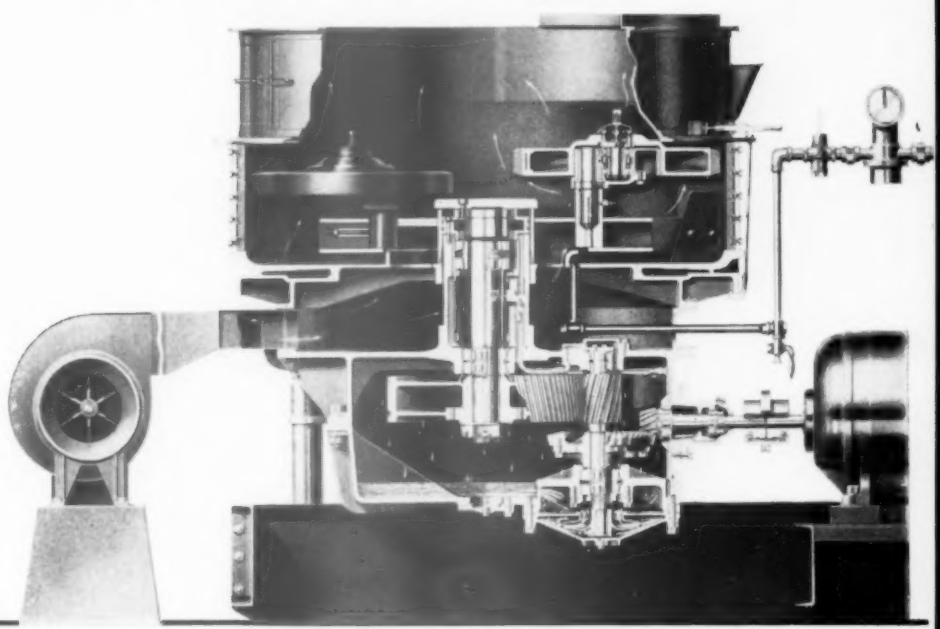
THE SPEEDMULLOR

1. The Speedmullor *mulls* sand—not merely mixes. The positive turning of the rubber-tired mulling wheels, the application of uniform pressure on the sand between the wheels and rubber-lined side-wall, and the rapid agitation which keeps the entire batch of sand constantly in motion, *assure* the most complete and thorough distribution of all water and bonding materials.

2. The Speedmullor mulls sand 4½ times as fast as any sand mixing unit. It thoroughly mulls all types of sand, even sand containing the highest bond or oil additions in 1 to 1½ minute cycles. Speedmullor mulled sand requires no further aeration and is absolutely uniform in quality and texture.



Cross section view of the Speedmullor with air cooling. The arrows indicate how the cool air is forced up through the sand, cooling it to within 10 degrees of room temperature—as it mulls—all in a 1½ minute cycle.

3. Many foundries are now using Speedmullor cooled sand! The *exclusive* design of the Speedmullor permits the passage of air through the entire batch of sand as it is mulled. *Only in the Speedmullor* can efficient cooling be accomplished. So put hot sand into the Speedmullor—it will mull, cool and aerate the entire batch—all in the same cycle.

The exclusive design and features of the Speedmullor assure (1) fastest mulling, (2) thorough mulling, (3) most efficient cooling, (4) maximum uniformity, (5) highest unit capacity.

Speedmullors are furnished with or without skip hoist; air cooling; fines removal. For the ultimate in production and efficiency, Speedmullors are equipped for completely automatic operation—loading, mulling, fines removal, cooling and discharging. There are six sizes of Speedmullors to meet the exact requirements of every foundry—large, medium and small.

SEE THE SPEEDMULLOR IN OPERATION

See the Speedmullor in action—mull, cool and remove fines. We will make complete arrangements in a foundry near to you. Write today!

BEARDSLEY & PIPER
DIVISION OF PETTIBONE MULLIKEN CORP.
General Offices: 2424 N. Cicero Ave. Plant: 2541 N. Keeler Ave.
Chicago 39, Illinois

Beardsley & Piper are manufacturers of Sandslingers • Speed-Slingers • Speedmullors • Screenarators • Mulbaros • Sand Conditioning Machines • Champion Speed Draws • Plate Feeders • Turntables

ANTICIPATE WINTER!
FILL YOUR SAND BINS NOW

• Cold, freezing weather is not far away, and with it, the difficulties of shipping and unloading sand. Frozen sand is expensive to unload. Snow storms often tie up the railroads. The car shortage will not improve at such times. Therefore—to assure adequate stocks of sand for your winter production, fill your bins now. We can ship your winter requirements during the dry, autumn weather, making prompt delivery.

MOLDING SAND ● FURNACE SAND *The Quality you Need*

4 FOUNDRY AND FURNACE SANDS
• PORTAGE
• GEAUGA
• COXEY
• VENANGO

All types of sand are available—for light, heavy and medium steel castings and for acid furnace bottoms. They are preferred by foundry men for their high quality and workability. Each is shipped from a plant in the heart of the steel foundry industry. Also sand blast sand for every need.

INDUSTRIAL SILICA CORPORATION
Stambaugh Bldg.
Youngstown, Ohio

FOUR PLANTS » » » » » » » » » » Phalanx, Ohio · Geauga Lake, Ohio · Dundee, Ohio · Utica, Pa.

(*Continued from page* 193)

Each flask, now containing the casting, is allowed to cool to room temperature and then is sent to a pneumatic hammer. The flask is placed on a grilled table and the investment material knocked away from the casting. Investment material falls through the grill and is caught in a container housed in the enclosed table base. A hood over the table removes dust. (Fig. 20). After the investment material is knocked clear, the casting is thoroughly cleaned by sand or steel shot blasting.

At this point there is an exact metal replica of the wax sprue and patterns. All that remains to be done is to remove the sprue which, since it also serves as a riser, often weighs more than the casting itself. Sprues are removed at Bayonne by a cut-off wheel. Further finishing depends upon the surface desired in the finished casting. In some cases, buffing and polishing (Fig. 18) is required. In most cases, the casting, which has a naturally smooth finish, is suitable in the as cast condition.

Critical castings are given a detailed dimensional check and radiographs are taken to expose any internal defects. By the time the finished pieces emerge from such examination (Fig. 19) they have been thoroughly examined for conformation to rigid specifications and the required tolerances.

To date, the largest casting produced at Bayonne by the pressure method has not exceeded 3½ lb; however, some castings weighing up to 20 lb have been produced from the induction furnace by precision investment casting with regular foundry technique.

Precision investment castings in nickel alloys are produced in Monel

Elks, Foundrymen And Beauties

The reputation for generous spending established by foundrymen at the Philadelphia Convention of the American Foundrymen's Society seems to linger. For example, during the Elks Convention at Philadelphia, one of the local papers carried the comment "The brethren Elk are the happiest spenders since the foundrymen convened here."

And speaking of publicity, did you notice a "Miss Foundry" is one of the bathing beauties in the contest being staged in the comic strip "Tillie the Toiler"?

Inconel and nickel, as well as in "H" Monel and "S" Monel, the last two being heat treatable alloys of exceptional hardness and strength.

Production is not limited, however, to the nickel alloys. Castings have or can be produced in a range of the nickel irons, nickel steels—including austenitic stainless steels—and even in some non-nickel bearing materials.

Laboratory tests have indicated that mechanical properties of precision investment castings in nickel alloys run approximately 10 per cent higher than those of sand castings in the same materials.

Nickel castings are strongly magnetic; Monel castings are slightly magnetic, and "H" Monel and "S" Monel are nonmagnetic down to minus 70° F. Inconel also is nonmagnetic down to low temperature.

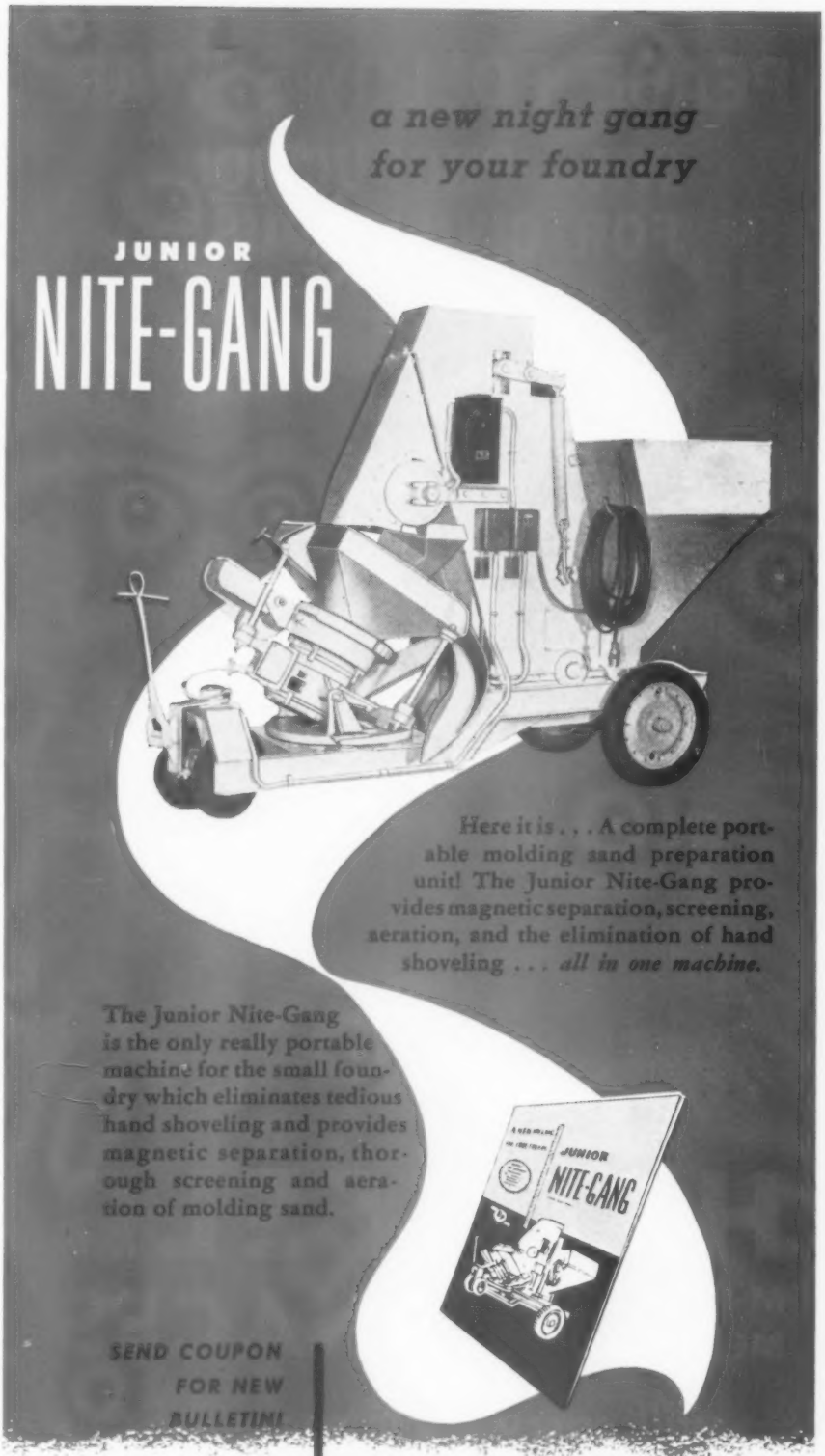
Monel precision castings have the same high resistance as wrought Monel to corrosion at normal and moderately elevated temperatures by reducing mineral acids, such as sulphuric and hydrochloric; organic acids; salt solutions, both acid and neutral; food and food acids; strong alkalies; dry gases, such as chlorine and ammonia; certain alkaline salts and most atmospheres.

Alloy Does Not Oxidize

Monel precision castings can be used in nonsulphurous atmosphere at temperatures up to 800° F under stress, and up to 900 to 1000° F in unstressed conditions. The alloy does not oxidize at a destructive rate below approximately 1000° F and the oxide formed in this indicated safe range of temperature is adherent and does not flake off.

For many applications, castings must have good ductility with increased but not maximum hardness. These requirements are met by "H" Monel containing 2.25 to 3.50 per cent silicon. This alloy offers the same order of resistance to corrosion as cast Monel, is slightly stronger, harder, more resistant to abrasion, but not outstanding for resistance to galling. It takes a good finish from grinding. Its increased hardness renders it useful for steam nozzles and other parts that must resist mild erosion.

"S" Monel contains approximately 4 per cent silicon, which hardens it to a brinell hardness of approximately 321 as cast. This high hardness, in conjunction with the special structure of the alloy, results in good gall and erosion resistance thus making the alloy particularly suitable for valve seats, and sliding or other moving elements. Another characteristic of "S" Monel is its retention of hardness at moderately high temperatures.


a new night gang
for your foundry
JUNIOR
NITE-GANG
Here it is . . . A complete portable molding sand preparation unit! The Junior Nite-Gang provides magnetic separation, screening, aeration, and the elimination of hand shoveling . . . all in one machine.
The Junior Nite-Gang is the only really portable machine for the small foundry which eliminates tedious hand shoveling and provides magnetic separation, thorough screening and aeration of molding sand.
JUNIOR
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SEND COUPON FOR NEW BULLETIN!

B&P

Beardsley & Piper are manufacturers of the Sandslinger • Speedslinger Hydra-Slinger • Speedmuller • Mulbaro • Screenarator • Junior Nite-Gang Preparator • Champion Speed-Draw • Plate Feeders Turntables • Gyratory Screens

BEARDSLEY & PIPER
Division of Pettibone Mulliken Corp.
General Offices: 2424 North Cicero Avenue
Plant: 2541 North Keeler Avenue
Chicago 39, Illinois

☐ Send new Nite-Gang Bulletin.
☐ Where may I see Nite-Gang in operation?
☐ Have B&P representative call.

FOUNDRY _____
ATTENTION _____
TITLE _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____

PEACE FOLLOWS WAR
WITH PRODUCTION
FOR CIVILIAN USE

HAUSFELD
METAL MELTING FURNACES

...will carry their share of this vital work in the days to come

FURNACES FOR
BRASS • ALUMINUM • MAGNESIUM
AND ALL OTHER
NON-FERROUS ALLOYS

The Campbell-Hausfeld Co.
300-320 MOORE ST. HARRISON, OHIO

Cast nickel has corrosion resistance similar to that of wrought nickel and is useful for applications in process equipment handling corrosives that have less effect on nickel than on alloys of nickel, as for example, caustic alkali solutions. Nickel castings are used also when it is desired to avoid contamination of a product by such metals as copper or iron. A certain amount of hardening of nickel can be accomplished with silicon additions, and resistance to galling under faulty lubrication can be provided by suitable adjustments of the minor constituents, including carbon.

Michigan Regional Foundry Conference

Michigan Regional Foundry Conference, sponsored by Michigan State College, East Lansing, Mich., in cooperation with the four Michigan Chapters of the American Foundrymen's Society, will be held Oct. 1 and 2 in the college's R. E. Olds Hall of Engineering.

Technical sessions on Friday afternoon will be under the chairmanship of O. E. Sundstedt, general manager, General Foundry & Mfg. Co., Flint, Mich., and chairman, Saginaw Valley Chapter of the AFS. A. W. Stolzenburg, Aluminum Co. of America, Detroit, and chairman, Detroit Chapter of the AFS, will be technical chairman of the Saturday sessions.

The program follows:

Friday, Oct. 1

8:30 a.m.—Registration.

8:30-9:15 a.m. — Inspection of engineering shops.

9:45 a.m.—Welcome address by Karl H. McDonel, Secretary of State, Board of Agriculture.

10:00 a.m.—Report from national AFS officers. Technical chairman: Stan Davis, supervisor of sand control laboratory, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.

10:30 a.m.—Discussion of mold and core wash materials by Dr. J. A. Ridderhof, manager, foundry facings department, Frederic B. Stevens Inc., Detroit, and Robert Melmoth, Ford Motor Co., Dearborn, Mich.

12:15 p.m.—Luncheon.

2:00 p.m.—"The Physical, Mechanical and Chemical Properties of Foundry Core Binders," Joseph Getzen, president, Delta Oil Products Co., Milwaukee.

3:00 p.m.—"Gray Iron Metallurgy and Foundry Practice," K. H. Priestly, Vassar Electroloy Products Inc., Vassar, Mich.

4:00 p.m.—To be announced.

6:30 p.m.—Dinner and entertainment at Hunt Food Shop, East Lansing. Chairman: L. P. Miller, dean of engineering, Michigan State College. Address: "My Year in Japan," Russell E. Horwood, associate professor, dairy department, Michigan State College.

Saturday, Oct. 2

9:00 a.m.—"Attracting and Keeping Good Men in Your Foundry," George Tubich, district engineer, Michigan Department of Health.

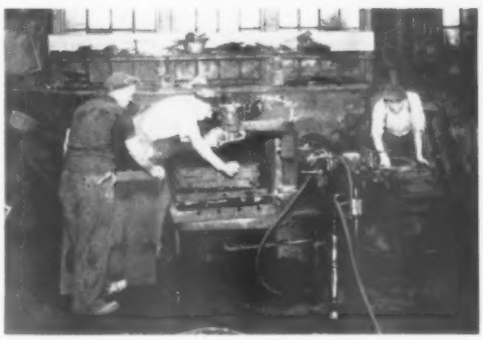
10:00 a.m.—"Sand, Metal or Men?" Harry E. Gravlin, Ford Motor Company, Dearborn.

2:00 p.m.—Football game: Michigan State College vs. University of Hawaii.

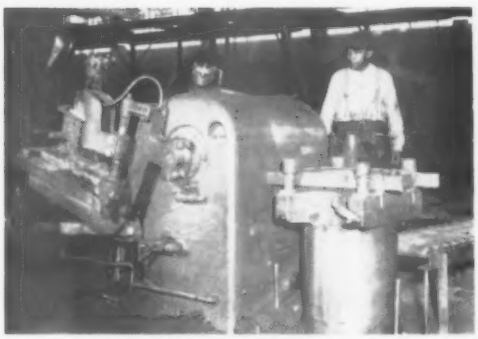
Wherever SAND MOLDS are made . . .

Simple adjustment to deliver shallow or deep flask

Davenport Molding Machines Excell



Striking off and setting cores



Draw table in position to recieve mold

"Davenport" Jolt Rollover Draw Model A

In the production foundries—
In the job foundries—
Davenport molding machines prove a good investment.

For the big job or the little job, you will find a "Davenport" molding machine that will give you better molds in less time at lower costs.

Let us send you our catalog.

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DAVENPORT, IOWA U.S.A.

Representatives: Canada—Canadian Foundry Supplies & Equipment Ltd., Toronto and Montreal France, Belgium, Luxemburg, Switzerland—Ph. Bonvillain & E. Ronceray, Choisy-Le-Roi, Rue Paul Carle, Seine, France. All other foreign countries—R. K. Price Associates, Inc., 70 Pine Street, New York 5, New York, U. S. A.

THE ADVENTURES OF *Bill*

By PAT DWYER

Drawings by RICHEY

THE last time I was over here," Bill said, "putting on—if I do say so myself—a fair impersonation of an old tar recently returned from a life on the ocean wave and all that there kind of stuff, to indicate a safe return from a deep-sea cruise on the Great Lakes, you put up the STOP sign when I added Yo-ho-ho an' a bottlarum to the home on the rolling deep. Your weasely objection was based on your claim that the two sterling hunks of poetry were composed by different authors at different times and under different circumstances and could no more be mixed than oil and water.

"Following a modest hint regarding a bit of high financing, one of my sharp young grandsons quoted from memory a couple of verses from the old time chantey 'Fifteen Men on a Dead Man's Chest.' Since you set yourself up as an authority on the subject, maybe you can tell me how to plant fifteen very tough characters on a dead man's chest. Certainly not on the chest, a definite section of their dear departed companion. Equally certain they could not perch like a row of pigeons on a modest little box or sea chest 30 in. long, 18 in. wide and 18 in. deep."

"As a plain matter of fact," I admitted, "although I have read the lines several times and have heard them quoted many times, more or less correctly, I never have seen or heard a satisfactory explanation for that apparently impossible athletic performance. My own private impression is that the inspired writer was sitting, or more likely lying too close to the bottlarum, while composing the masterpiece. The combination of words appealed to his muddled mind. The idea that future readers or singers might come to grief over the meaning, never occurred to him. If the idea had occurred to him, or if a well meaning friend had offered a mild criticism, the metrical minded toss-pot would have declared that if a future singer could not understand a certain line, that was his hard luck. He could take a long running jump over the stern. Yo-ho-ho and a bottlarum! I trust the foregoing covers your more or less useless inquiry in a thoroughly satisfactory manner."

"Just about as well as I expected, dearie, if you get what I mean. While I still was hot on the trail I was minded to write the Q & A department of the only one of our daily papers in which I have any confidence. However, before I got around to this little bit of extra curricular activity, I read an item which seemed to demand more immediate attention. I don't know whether my favorite columnist missed it, or deliberately let it go through to irritate certain readers like me, who like to see and hear things called by their proper names. As the people in central Pennsylvania say 'give a lissen vunce.'"

My admiration for your apparent omniscience was mildly jolted by a quotation in one of your recent columns. I have no comment on the correspondent's opinion of what is wrong with the economic situation. Every man is entitled to his own opinion. My comment is based on an item very similar to the old Biblical story of the spies who betrayed themselves at one of the numerous crossings of the Jordan in the everlasting internecine wars of these far away days. They were doing very nicely indeed in the spying act until a suspicious examiner—a veteran sergeant, don't you think?—asked them to say *Shibboleth*. The best they could do was *Sibboleth*. And that was the end of them.

Here is the passage where your correspondent slipped on his Shibboleth: 'A forging upon which I work frequently has been coming to us with a portion of it 1/32-inch thinner than it should be when finished. In measuring dress goods 1/32-inch in length means little or nothing. When the unit of measurement is approximately 1/32 of 1/32 inch it makes it difficult to hold up production levels either as regards quantity or accuracy. Undoubtedly the foundry whence these forgings come is under heavy pressure, and the result is over hurried work with consequent lack of accuracy.'

So what? I'll tell you so what.

Product of a foundry is castings. Molten metal is poured into sand or metal molds. Forgings are solid pieces of steel, manipulated to the desired shape under a hammer or in some form of mechanical pressing device. A man presumably familiar with forgings knows where they come from. Certainly he would not be apt to say they come from a foundry.

The entire effort is suspiciously similar to the work of so many newspaper reporters who never lose a chance to refer to brawny steel puddlers. Steel is not puddled.

"And then," I said, "you received a

(*Continued on page* 202)

Bitter personal references spice the noon-hour debate on Why Are We Here? and Where Do We Go From Here?

MONORAIL HANDLING *Improves* Foundry Production

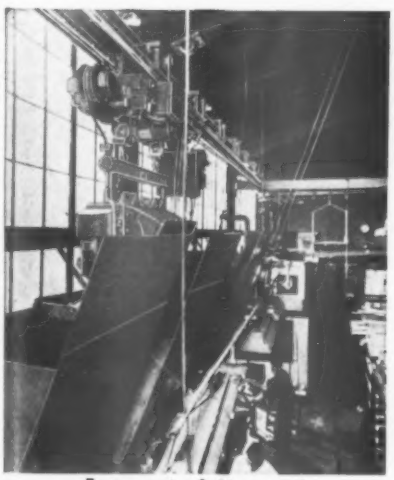
American MonoRail Overhead Handling Systems have eliminated much of the floor congestion typical in foundry operations.

With "Up and Over"★ type of handling, from cupola to shipping, an overhead track or crane system does a better, quicker job with less maintenance.

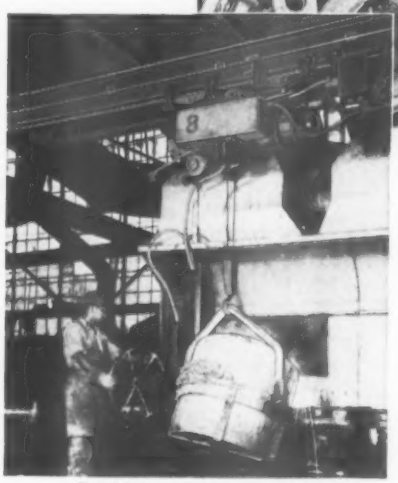
Let an experienced MonoRail engineer explain complete advantages with no obligation, of course.

Mechanized charging brings better metal.

Heavy castings move easily on MonoRail through sandblast.



Automatic delivery of sand to core benches.



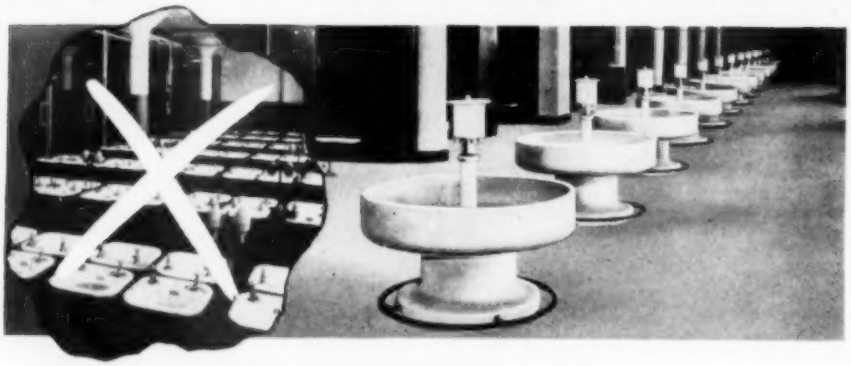
All labor mechanized for pouring engine blocks.

★"Up and Over" is the title of our 16 MM, sound, twenty minute movie..gladly loaned upon request.

THE AMERICAN MONORAIL COMPANY

13104 ATHENS AVENUE CLEVELAND 7, OHIO

HOW TO SOLVE—
Employee Washing Problems



1. USE BRADLEY WASHFOUNTAINS

One Bradley group Washfountain serves 8 to 10 persons simultaneously — comfortably and quickly with maximum sanitation and health protection. Foot-control keeps hands free from contagious infections while the self-flushing bowl prevents contaminating dirt collections. One Bradley eliminates from 16 to 20 faucets and reduces piping connections by 80%. Assure your workers of sanitary, adequate wash facilities with Bradleys.

2. USE BRADLEY DUOS for Office and Executive Personnel

One Bradley DUO-Washfountain takes the place of two conventional basins with the one DUO sprayhead replacing four ordinary faucets. In addition, the self-flushing bowl and automatic foot-control reduce maintenance and afford maximum sanitation. Further details can be secured by writing for DUO Bulletin 464-D.

BRADLEY washfountains

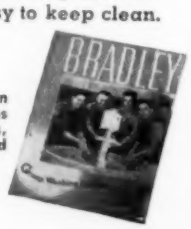
BRADLEY WASHFOUNTAIN CO.
2217 W. MICHIGAN STREET, MILWAUKEE 1, WISCONSIN

3. FOR SANITARY SHOWERS
Install Bradley Multi-Stall Shower Units

Showers are an important wash requirement in many factories, schools, and institutions. Bradley Multi-Stall Showers come in either 5-or 3-Stall Units. One 5-Stall requires only 2 supply lines and one drain compared to the 15 plumbing connections required for five ordinary "single-stall" showers. They are sanitary, simple to install and easy to keep clean.

BRADLEY multi-stall showers

For complete details on Bradley Washfountains and Multi-Stall Showers, send for new illustrated Catalog 4701.



(*Continued from page* 200)

two-finger typewritten sheet with an elaborate explanation. On the day in question, while our hero was matching pennies with the Governor or pulling the Mayor out of a deep municipal hole, his junior assistant—soon to become his ex-junior assistant—let the correspondence go through. This blithe young spirit did not know whether castings and forgings came out of a foundry, a forge shop or the five and ten at the corner of Main and Maple streets."

"As a true friend and well wisher, I should strongly advise you to keep well away from all forms of quiz programs where prizes are handed out freely to those whose answers indicate that they know who is leading the league in base hits and stolen bases, those who recognize song hits that have been pounded into their ears at home and abroad for the past six months, and those fortunate ones who boldly declare that the name of a famous 15th century navigator was the same as that of a prominent central Ohio city. On one of these programs you would lose out and probably be fined $2.75. So far as I know the fine feature has not yet been introduced, but these give away lads are bound to think of it sooner or later. A short session with the boys who sit in high places and think up new objects of taxation might give them ideas. These financial vampires —"

"Probably," I said, "the old mental machine needs a drop of oil or something. Out of your charity you will be kind enough to tell me what connection exists between a bit of newspaper correspondence and a flock of financial vampires sucking the life blood in largs gobs from a free and enlightened people. That means US, in case the former term was too fast or too high. If you can make a radio announcer rehashing a ball game in all the—to me—tiresome details, and within the limits of a 100-word vocabulary, you will remember that at point (a) you were writing a letter to a newspaper columnist protesting the contents of another letter, in which the writer claimed he was working on forgings too small in some dimensions to finish properly. These forgings, he added carelessly, came from a foundry.

"At point (b) you pointed out in a mild and dignified manner certain discrepancies published a week later and edited in the usual manner by deletion of a paragraph. In the opening paragraph you expressed admiration for the columnist's writing

(*Continued on page* 205)

Jolt-squeezer molding stations in a large gray iron foundry.

WHAT JEFFREY MAKES FOR THE FOUNDRY:

PADDLE MIXERS
SCREENS
SANDITIONERS
MOLD CONVEYORS
AERATORS
BIN VALVES
CONVEYORS
BUCKET ELEVATORS
FLASK FILLERS

Jeffrey-Equipped means Efficient Operation

This photo shows the pouring and mold transfer in the same foundry – molding stations in background.

THE JEFFREY MANUFACTURING COMPANY

ESTABLISHED 1877

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Complete Line of Material Handling, Processing and Mining Equipment

FOR EVIDENCE of CARL-MAYER OVEN SATISFACTION

Read our Mail

Letters like this, and we have many of them, prove that Carl-Mayer oven design contributes greatly to improved core room results. Carl-Mayer Patented *(Pat. No. 2,257, 180)* Recirculating Heating System, obtainable only on Carl-Mayer Ovens, assures unusually fast and uniform baking with amazing fuel economy. Carl-Mayer design also keeps working conditions *comfortable* because heat and fumes are removed from the cores before they reach the unloading zone.

High grade construction keeps maintenance *low.*

WRITE FOR BULLETIN showing the extensive line of Carl-Mayer Core and Mold Ovens.

Union Brass & Metal Manufacturing Company

INCORPORATED 1892

PLUMBERS BRASS GOODS

Telephone Humboldt 1331 — 501 West Lawson Avenue — Saint Paul 3, Minnesota

April 9, 1947

Mr. C. F. Mayer, President
The Carl Mayer Corp.
3030 Euclid Avenue
Cleveland 15, Ohio

Dear Mr. Mayer:

We are very much pleased to enclose two copies of a photograph showing your core oven and our core room layout. The gentlemen in the picture reading from left to right are our Sales Manager and Secretary, Mr. George F. Gerlach, and our President and General Manager, Mr. Henry J. Michel.

Since this picture was taken, we have added two core blowing machines. They are approximately directly under the receiving tanks which are shown in the picture.

As you probably know, our new core room was laid out on paper and a building constructed to house this new equipment. We are very proud of our new core room and would be more than glad to show it to you or to any one interested.

The oven is operating beautifully, and we are very much pleased with the results so far.

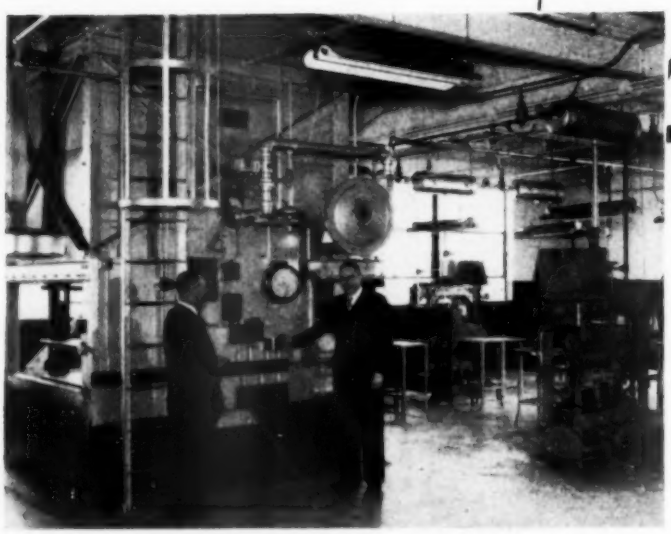
Yours very truly,

UNION BRASS & METAL MFG. CO.

C. J. Becker
Vice Pres. & Treasurer

CJB:jh

Encl. 2



CARL-MAYER VERTICAL CORE OVEN
At Union Brass & Metal Mfg. Co., St. Paul, Minn.

Typical Carl-Mayer Customers!

MANY REPEAT INSTALLATIONS

Aluminum Co. of America
American Brake Shoe Co.
American Radiator Co.
Brown Industries
Bucyrus-Erie Co.
Crucible Steel Castings Co.
Dunkirk Radiator Co.
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Ford Motor Co.
Fremont Foundry Co.
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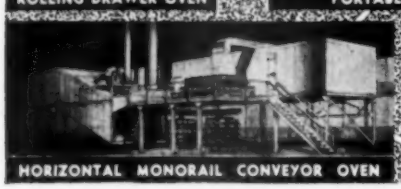
General Steel Castings Co.
Golden Foundry Co. Inc.
Henry Kaiser Corp.
Jarecki Mfg. Co.
W. O. Larson Foundry Co.
F. E. Meyers & Bro. Co.
Oil Well Supply Co.
H. B. Salter Co.
Shenango Penn Mold Co.
Studebaker Corp.
Union Brass & Metal Mfg. Co.
A. C. Williams Co.
Whiten Machine Works
Whiting Corp.

ROLLING DRAWER OVEN

PORTABLE RACK OVEN

VERTICAL OVEN

CAR TYPE OVEN



HORIZONTAL MONORAIL CONVEYOR OVEN

The CARL-MAYER Corp.
3030 EUCLID AVE., CLEVELAND, OHIO
CORE AND MOLD OVENS

(*Continued from page* 202)

style, for his wide range of knowledge, and for his accuracy. The second paragraph contained a freely translated account of a spy catching trick in vogue several thousand years ago and still practiced. A slight variation was quoted to show how the correspondent got his feet caught in the bird lime. Apparently he does not know the difference between a forging and a casting. You concluded (c) by throwing all the submitted evidence out of court and declaring boldly that the tendency of reporters to introduce shop or technical terms into an industrial story, always induced a more or less severe attack of mental nausea.

"Blacksmiths invariably swing heavy sledges, when as a matter of fact and plain common sense—the man has to hold the tongs in one

Reading maketh a full man. Ha!

hand—he uses a hand hammer. When necessary his helper, or apprentice, swings the sledge hammer. Almost without exception every man who works in an iron or steel plant is a brawny steel puddler. A few minutes' prowl in any one of a variety of publications, including an ordinary encyclopedia, would show that puddling is not a part of the steel making or steel fabrication process.

"You went over all that ground. When I asked to see or hear the reply, you start talking about vampires, a peculiarly repulsive member of the bat family. Sneaks up on a sleeping man or beast, slips a sharp beak into his big toe on either or both exposed feet and gently sucks out as much blood as his rubbery stomach or stomachs can hold while staggering home to his hanging up place in a convenient cave.

(*Continued on page* 208)

Announcing

THE BEST INVESTMENT IN DIRT AND DUST CONTROL EQUIPMENT YOU CAN MAKE!

Schmieg NEW all *Stainless Steel* ARRESTER UNIT

for SAND HANDLING *and* SHAKEOUT

Because it is made of stainless steel and *because* it is designed and manufactured for longer, corrosion-free operation, the new Schmieg 30,000 C.F.M. Centri-Merge Swirl Type Arrester illustrated is the best buy on the market. Stainless steel is your guarantee of long-range low maintenance costs. A Schmieg unit is easily installed to occupy a minimum of valuable floor space for the most efficient removal of dust and dirt from shakeout stations, sand handling and conditioning systems. Sludge disposal is perfectly simple—you use nothing more than a skid on a lift truck. We urge you to consider carefully the *dollar-saving advantages* of an investment in a Schmieg stainless steel Arrester Unit.

Consult Schmieg engineers regarding your problems of dust and fume control.

THE *best* AIR PURGE *is* CENTRI⊗MERGE

Schmieg INDUSTRIES INC.
Engineers & Manufacturers

302 PIQUETTE AVENUE • DETROIT 2, MICHIGAN

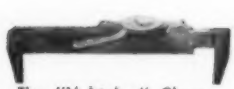
FEDERAL SUPPLIES

FEDERAL'S LOWE SIFTER

Save money by faster sifting, better sand conditioning with a Lowe Electric Sifter. Features: greater screening area, enclosed ball bearing motor, more shoveling room. Write for information. Prompt delivery.

CLIMAX WIRE STRAIGHTENERS

Any foundry, large or small, can cut production costs by straightening and reusing core wires and rods. With a Climax Wire Straightener this can be done quickly, economically, safely — by unskilled labor. A complete descriptive circular is yours for the asking.



The "Lightning" Clamp

The "Holdtite" Clamp

CLAMPS

Federal offers two types of flask clamps.

The "Lightning" clamp is an eccentric type, requiring no wedges and available in two sizes: No. 2, 8" to 12" and No. 3, 12" to 20".

The "Holdtite" is an adjustable clamp designed for use with wedges and is also offered in two sizes: No. 1, 13" to 23" and No. 0, 18" to 33".

Both clamps made of sturdy malleable iron, rigidly reinforced to prevent distortion.

FEDERAL'S WONDER CUTTERS

Two compact cutters for rods and band iron. One cuts up to 5/8" round and the other to 7/8" round. Readily mounted on any bench. Users say they're worth their weight in gold!

RUBBER-COVERED SHOVEL HANDLES

The best insurance you can buy against damaged patterns, core boxes or flasks. The pean-shaped grip is ideal for ramming.

They will fit your present shovels or you can order your next shovels with them already installed.

TWISTED STEM CHAPLETS

The chaplet with everything. The "Twisted Stem" promotes rapid complete fusion. Not deformed, the stem has no weak spot to burn in and permit core shift. Made in a complete range of sizes. Samples of the size you use, gladly submitted.

WATER BRUSH

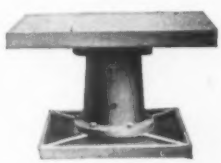
Easy to Grip and Hard to Tip. It can't leak and one filling lasts all day. Does not tire the molder's hand.

BLAST CLEANING NOZZLES

Air consumption is reduced and the blast is concentrated because the hole in the nozzle wears very slowly. Made in all sizes and types. Write for circular.

FEDERAL JOLT MACHINES

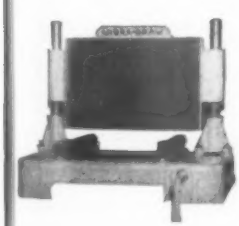
Air operated, fool-proof jolt machines that ensure uniform cores. Sturdy cast iron construction with no external valves to wear out. Made in four sizes. Get our prices and deliveries.



SHUR-SPOT SPRUE

Designed for use on squeezer-made molds, Shur-Spot squeezes right down with the sand. When the squeezer board is removed, the Shur-Spot pops up and can be lifted right out. The result is a fully completed and properly located pouring sprue that requires no finishing. Shur-Spot Sprue eliminates danger of falling sand.

For complete information on the Shur-Spot Sprue, write for the circular on this low-priced easy-to-use item.



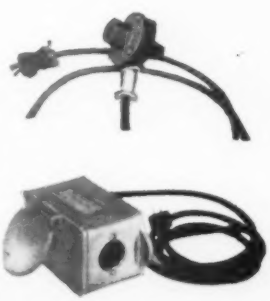
FEDERAL'S "VIBRA-DRAW" CORE DRAWING MACHINE

Cuts costs in your core room by making it easy for every core maker to draw perfect cores as fast as he can fill the core box, place it against the vibrating head and lift the box. Made in two styles: the floor model and the portable bench model shown here. Immediate delivery — write for details.

FEDERAL VIBRATOR No. 2 and 5

Federal's own make and available for immediate delivery. Hard-chromed piston guarantees long life. For 110 volt, 60 cycle, single phase operation. $15.60 each, f.o.b. Cleveland; No. 5 for heavier duty—$20.40 each.

Federal also has a new "convenience outlet knee switch." No taping, soldering or wiring. Plug in—that's all. Carried in stock. $6.50 each, f.o.b. Cleveland, Ohio.



THE FEDERAL FOUNDRY SUPPLY COMPANY

4600 East 71st Street • Cleveland 5, Ohio

CROWN HILL, W. VA. • CHICAGO • MILWAUKEE • DETROIT • ST. LOUIS

CHATTANOOGA, TENN. • ST. PAUL • NEW YORK • RICHMOND, VA. • UPTON, WYO.

Chamberlain Co. Los Angeles, Calif.
Pacific Graphite Works, Oakland, Calif.

Shanahan's Ltd., Vancouver, B. C.
LaGrand Industrial Supply Co., Portland, Ore.

for New protection against Old hazards ...get WILLSON

Style No. X41

GLOVE-FIT PROTECTION AGAINST SPLASH ... This Over-All* rubber goggle with snug fitting resilient rolled edge takes the danger out of splash and spatter; provides wearing comfort over spectacles.

Style No. 731

ONE-PIECE CAP CARTRIDGE ... New chemical cartridge respirator with four interchangeable cap cartridge filters protects against low concentrations of specific vapors and gases. U. S. Bureau of Mines Approved.

Style No. 750D

SETTLE THE DUST PROBLEM ... Newly approved by Bureau of Mines for all dusts. Easier breathing over long periods provided by extra large dual throw-away filters. *Reg. U. S. Pat. Off.

For complete information on these products and their application, as well as many more eye and respiratory protective devices, get in touch with your nearest Willson distributor or write us direct.

GOGGLES • RESPIRATORS • GAS MASKS • HELMETS

DOUBLE WILLSON

PRODUCTS, INCORPORATED

237 WASHINGTON STREET, READING, PA., U. S. A.

(*Continued from page* 205)

"In other words, my dear young fella, not to put too fine a point upon it and all that there kind of stuff what kind of a reply did you receive from this newspaper man?"

"Well," said Bill, "I'll tell you. The reply might go into one of your slightly faded blue eyes without in any way impairing the sight or causing you the very minimum amount of disturbance. Did you ever get a grain of sand in your eye? Then you know I may be referring to something too small to be seen by the naked eye, but in the existence of which there is no doubt. Which means that I received exactly nothing from the columnist or from the gifted operator whose forgings came from the foundry."

"In common with the times and the people," I pointed out in my best pedagogical manner—I wonder if that is spelled right—"newspaper methods have changed to a considerable extent since we took a hurried glance at the evening paper before starting out for whatever adventure might befall in our somewhat limited field, and limited time of operation. The first depended to a great extent on the staying qualities of a livery stable horse and buggy. The second hinged upon the necessity of reaching home in time to change into the working clothes, and to absorb—maybe gulp is a better word—a modest and not too frugal breakfast, meat, potatoes, griddle cakes, a few trifles of bread, a section of pie, and two or three cups of coffee. Just enough to prevent collapse before 11:30 a. m."

"Better call out the wrecker and get her back on the rails. She's in the ditch again."

"Quiet. Old 97 is on her own wheels, and rolling. Rolling back 40 or 50 years when the editor of a paper, especially a small town paper, encouraged duels between prominent citizens on practically any subject. I remember one of these tournaments which ran almost six months. Two eminent members of the clerical profession held diametrically opposed views on a subject of considerable local interest. Each doughty champion used the material in his Sunday sermon and then sent a revised and expanded copy to the newspaper. The canny editor, immune, neutral, and perfectly indifferent to the subject, presented the first letter on Monday, and the more or less indignant comment of the second hero on Tuesday.

"Practically every person in town read the paper, either at first, second or third hand and practically

(*Concluded on page* 210)

clearfield

muller type mixers

PROVIDE THE 11 ESSENTIALS OF FOUNDRY SAND PREPARATION

Ever stop to think about the many things good sand preparation requires? Here are the **11 ESSENTIALS:**

1. **MIXING:** the uniform distribution of sand grains, moisture and bond.
2. **SIZE CONTROL:** maintenance of grain size and structure.
3. **TEMPERING:** the working of moisture into the bond.
4. **AERATION:** the introduction of air into the sand mass.
5. **FLOWABILITY:** the quality of working smoothly with uniform density.
6. **CAPACITY:** the production of the greatest amount in the shortest time.
7. **BOND SAVING:** making the bond go as far as possible.
8. **PRODUCTION** of strong sand with minimum moisture additions.
9. **ECONOMY:** lowest possible per ton cost of all factors.
10. **CONVENIENCE** in operation
11. **PROTECTION** of workmen against health and accident hazards.

CLEARFIELD MIXERS

built in a wide range of sizes and models, guarantee efficient performance of all 11 essentials.

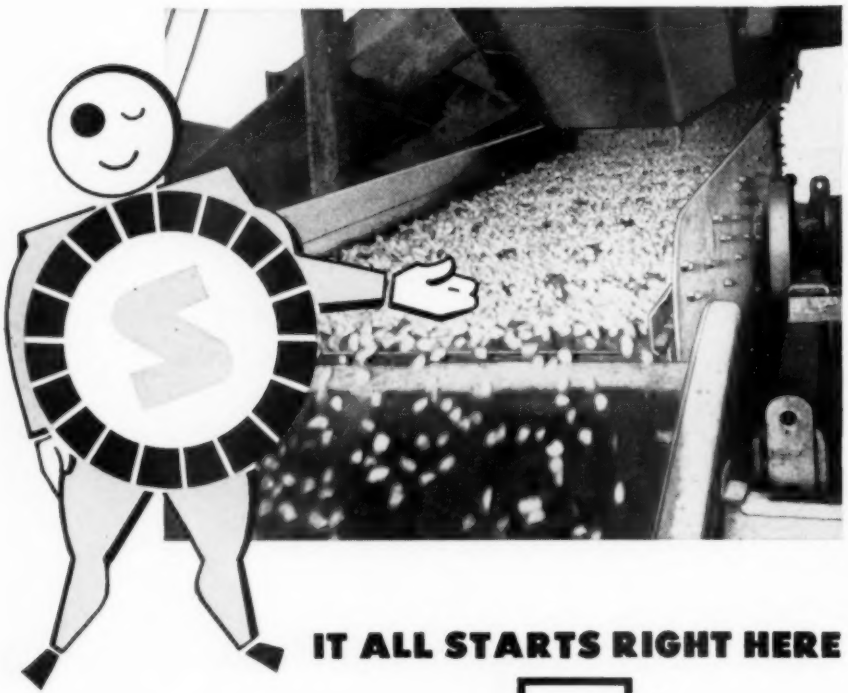
•

Write for catalog No. 79 for complete details.

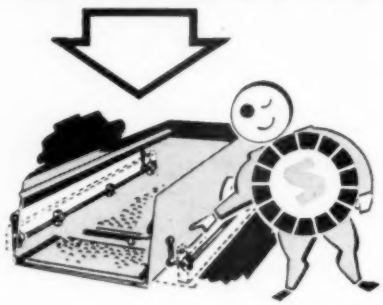
CLEARFIELD MIXER
MIXES, TEMPERS AERATES

CLEARFIELD MACHINE COMPANY
CLEARFIELD PENNSYLVANIA U.S.A.

See how evenly Seco vibrating screens convey the load . . .



IT ALL STARTS RIGHT HERE



This photograph of a Seco Vibrating Screen on the job shows how evenly and smoothly the load is moving over the screening surface. Seco's smooth performance is made possible by good design augmented by the Patented Equalizer Assembly (in outline). Because of this, Seco—and *only* Seco—offers *fully* controlled true circular action, under all load conditions.

For more tons per hour, efficiently screened—and for long, trouble-free performance—investigate Seco Vibrating Screens today. There's a right model for your job . . . and deliveries are good.

Operators everywhere are switching to Seco

Write Dept. O for A Guide to Better Screening

SECO

SCREEN EQUIPMENT COMPANY, INC.
PRODUCERS OF VIBRATING SCREENS EXCLUSIVELY
Buffalo 21, New York
In Canada: United Steel Corp., Ltd., Toronto

(Concluded from page 208)

every one, secretly or openly, was a member of one camp or the other. The crew of the shop where I was serving my time—very appropriate term—was about equally divided in their allegiance to the literary journeymen. Every point scored by their champion was flourished in triumph. Points scored by the opposition were quoted with boos of derision and other symbols of the most sincere unbelief and disrespect.

"While the two knights jousted within the ordinary rules of courtesy—and dangerously close at times to the law of the land, especially the branch dealing with libel—the readers were not handicapped in that manner. Classical allusions and sly references to certain affairs of common knowledge were readily understood and easily translated into the foundry vernacular. Where one writer hinted at the bar sinister and a strong canine maternal taint on the part of his opponent, the boys showed not the least difficulty or hesitation in supplying the proper foundry terms—"

"Would you mind telling me what was the initial cause of all the uproar?"

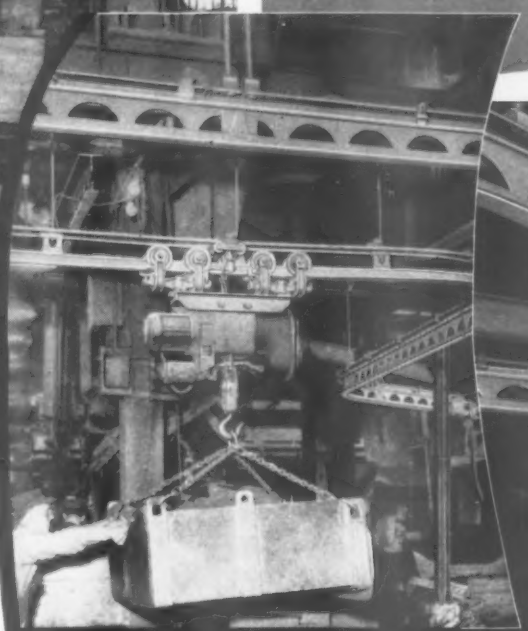
"That," said Bill," "is another story and I am no longer a member in good standing in the International, Independent and Benevolent Order of Second Story Men of America!"

Materials Handling Bulletin

General Electric Co., Schenectady, N. Y., has published a 96-page application manual entitled "Materials Handling," offered as part of the company's "More Power to America" program and prepared with the assistance and co-operation of materials handling experts, equipment manufacturers and power engineers. The manual lists the many available types of materials handling equipment and describes their application in some detail. It devotes considerable space to conveyor systems and benefits derived from their use. Other factors listed in the book are careful route analysis, considerations of physical plant conditions, analysis of handling methods, and a cost analysis. In addition, it explains in step-by-step fashion how to make an efficient material handling survey. The final pages contain helpful engineering data involving selection and use of materials handling equipment generally. Available from the Apparatus Department, General Electric Co., Schenectady, copies of the manual may be secured for $1 per copy.

3 TIME-SAVING STEPS IN HANDLING MOLDS TO SHAKEOUT

Dumping molds into shakeout box at pouring floor in a steel foundry.



Heavy loads are easily pushed on smooth overhead rails.

Molds are quickly emptied into shakeout by tipping box with air (or electric) hoist.

The handling of molds to shakeout is one of the many jobs simplified and speeded by overhead Cleveland Tramrail equipment.

Ten or more molds, depending on size are quickly dumped into a shakeout box at pouring floor. The box is conveyed to the shakeout on smooth overhead Cleveland Tramrail cranes and trackage by an easy rolling carrier that may be either of the hand-propelled or motor-driven type. When over the shakeout, it is quickly tipped and emptied by an air or electric hoist.

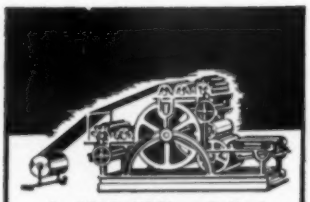
The same Cleveland Tramrail equipment also cuts costs in delivering molds to pouring floor and speeding pouring operations.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
3802 East 286th St., Wickliffe, Ohio.

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

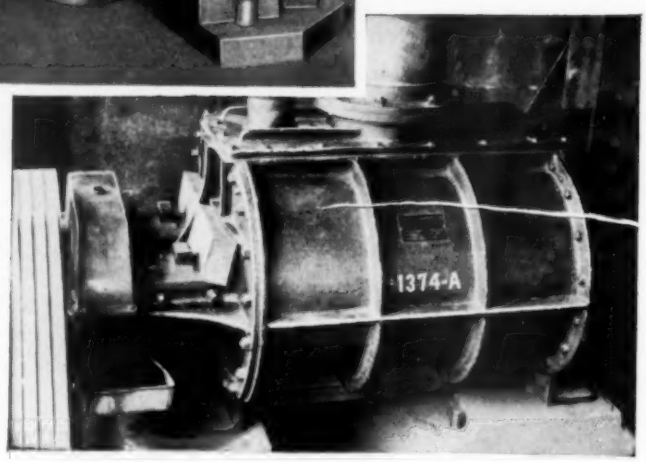


In 1865, William Bullock built the first press which printed from a continuous web or roll. Eleven years earlier, in 1854, the first Roots Blower was built. We're not good because we're old, but old because we're good.

Exclusive Service...

R-C dual-ability

R-C Centrifugal Blower, motor-driven, in foundry cupola service. Capacity 4,400 CFM.



R-C Rotary Positive Blower, for cupola service. Capacity 4,000 CFM at 16-oz. pressure.

You obtain an important, exclusive advantage when you consult us about problems of moving air or gas. That is, our *dual-ability* to supply either Centrifugal or Rotary Positive units.

This *dual choice* allows you to match equipment exactly to your needs, in capacities, pressures and other characteristics. You can have standard Rotary Positive units from 5 CFM up, or Centrifugal units to meet your top requirements. You save time, trouble and money.

So, utilize this exclusive *dual-ability* by consulting us on your requirements. The economy and dependability of R-C Blowers have been proved for almost a century.

ROOTS-CONNERSVILLE BLOWER CORPORATION
809 Madison Avenue, Connersville, Indiana

ROOTS-CONNERSVILLE ROTARY CENTRIFUGAL
BLOWER BUILDERS R-C SINCE 1854
BLOWERS • EXHAUSTERS • BOOSTERS • LIQUID AND VACUUM PUMPS • METERS • INERT GAS GENERATORS

• • ONE OF THE DRESSER INDUSTRIES • •

ALUMINUM ALLOY CASTINGS

(*Continued from page* 93)

As welding fluxes are corrosive, all traces should be cleaned off the repaired area as soon as the casting has cooled. Following this cleaning, the welds may be dressed down by usual methods and finished by polishing.

Large easily accessible areas, particularly in large castings, may be repaired by pouring molten metal directly into the defect from a small ladle. After the casting is preheated, the flux is brushed onto the surfaces to be welded and the area is maintained at the proper temperature by means of a torch. Molten metal at a temperature not over 1300° F is then poured into the cavity. Puddling with an iron tool facilitates the fluxing action.

Straightening — Castings that become warped during knockout or bent in the trimming and finishing process usually can be straightened without difficulty. Even the least ductile alloys can be straightened within reasonable limits, but local heating sometimes is required when castings of this type are badly out of shape.

In many instances blows struck with lead or rawhide hammers with the castings supported on a steel table will be sufficient. Suitable jigs and fixtures should be provided and repeated blows struck until the casting meets the specified dimensions. In straightening large castings, preheating may be necessary, pressure being applied by means of hydraulic jacks. For castings that are particularly susceptible to warping, it may be economical to provide straightening dies which are forced together by hydraulic pressure.

Machining — Aluminum alloy castings may readily be machined by means of standard machine shop equipment of the type used with other metals. In general, relatively high machine speeds give best results with most alloys—in fact, for many operations the speeds employed are the maximum possible speeds of which the machines are capable.

The general machinability of most of the alloys may be predicted from a knowledge of the composition. Aluminum of commercial purity is soft and chips from machining operations are inclined to be somewhat gummy. Alloying additions such as copper, zinc, and magnesium, which do not form extremely hard or abrasive constituents, usually improve the machinability. Alloys containing sili-

(*Continued on page* 214)

NUMBER 3 IN A SERIES EXPLAINING WHY

DUSTUBES COST LESS TO MAINTAIN AND OPERATE

Ease of Inspection
CLEAN, SAFE, SIMPLE
NO PARTS TO REMOVE

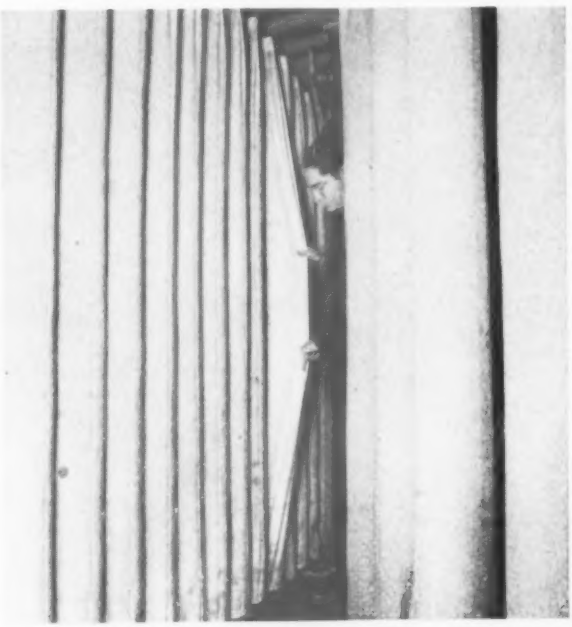
Filter Replacement
TAKES ONLY A FEW SECONDS
REQUIRES NO TOOLS

Dustube Filters
NO ABRADING METAL CONTACT
EASY TO SHIP, STORE, HANDLE

Power Savings
LOWER RESISTANCE TO AIR FLOW
LOWER AIR VELOCITIES

High Efficiency
NEARLY 100% EFFICIENT
BY CONVINCING TESTS

Better Dust Removal
SIMPLE, FAST, THOROUGH
SHORTENS CLEANING TIME



DUST COLLECTOR MAINTENANCE CUT TO THE BONE

Good equipment maintenance is profitable insurance—but the cost must be kept low. With DUSTUBE, the design is so simple and there are so few working parts to wear that only reasonable attention is necessary. One man can service it without any tools. Inspection is an easy, accurate job from the clean air side. . . .no heavy frames or screens to unbolt before the condition of the cloth can be determined. And when it comes to an infrequent tube replacement, only a few seconds are needed to hook the new tube on the shaker channel and insert the bottom in the cell plate over the dust hopper.

To these economies add the savings affected in operating DUSTUBES such as power savings, longer cloth life, shorter and less frequent cloth cleaning periods, less down-time. . .and you have some very sound reasons for investigating DUSTUBES further.

Write for your copy of Catalog 72A. It explains in detail the benefits of Dustube design.

American
WHEELABRATOR & EQUIPMENT CORP.
(FORMERLY AMERICAN FOUNDRY EQUIPMENT CO.)
505 S. Byrkit St., Mishawaka 2, Indiana

dustube
DUST COLLECTORS

No matter where you put them, Fuller Rotary Compressors do a job, and do it well. This has again been proven by one of the large manufacturing companies in the country . . . the Permanente Cement Company, directed by Henry J. Kaiser.

Two of its installations are shown above:

On land—Two Fuller Rotary Duplex Single-Stage Compressors installed in a cement plant. Each unit has a capacity of 2040 c.f.m., at 40-lb. pressure. These compressors furnish air for a Fuller-Kinyon Conveying System for transporting cement from storage silos to an ocean-going, cement-carrying vessel.

On sea—Three Fuller Rotary Single-stage Compressors, 'tween decks on the bulk cement-carrying vessel. Capacity of each unit 1560 c.f.m., 45-lb. pressure. These units furnish air for the Fuller-Kinyon Conveying Systems installed on board, which transport the bulk cement from ship to storage silos at destination.

Fuller Rotary Compressors are ideal units for any industrial plant, for capacities up to 3300 c.f.m., 125-lb. pressure. Thousands of users will verify this fact. The next time you need compressors, or vacuum pumps, get in touch with us.

Write for Bulletin C-5

FULLER COMPANY
CATASAUQUA—PENNSYLVANIA

Chicago 3 - 120 So. LaSalle St.
San Francisco 4 - 420 Chancery Bldg.

C-176

Fuller
A LIFETIME OF NEW MACHINE EFFICIENCY

(*Continued from page* 212)

con or manganese are harder to machine, because these elements form hard abrasive constituents which increase tool wear. The mechanism by which the various alloying elements influence machinability is not clearly understood, and therefore most of the information available is of an empirical nature.

Surface Finishes — Mechanical finishes applied by any of the well-known standard methods, such as polishing, buffing, or brushing, produce attractive surfaces on aluminum castings and fill requirements of many applications. For some purposes electroplating may be desirable. Where colored surfaces are required a chemical or electrochemical finish with suitable dyes may be applied. Aluminum also lends itself admirably to the application of paints, lacquers, and enamels.

If high resistance to abrasion or corrosion is called for, anodic oxidation of the surface is the best treatment. The coatings thus produced may readily be impregnated with dyes of various colors for decorative purposes or with special agents to increase the resistance to corrosion. They also serve as excellent bases for paint or enamel.

Following rough grinding and polishing a variety of mechanical surface finishes may be applied to aluminum castings. These may serve either as the final surface finishes in themselves or as bases for additional finishes. The actual operations depend somewhat on the nature of the casting as well as on the desired finish.

A fine polishing operation usually follows rough polishing. Sometimes called greasing or oiling, this operation is a refinement of the rough polishing and is similar to it, except that a lubricant is used on the wheel. A felt or sheepskin wheel is used, faced with emery ranging in fineness from No. 100 to 220. The lubricant reduces the danger of burning; tallow, oil, beeswax, or tallow compositions commonly are employed.

When it is desired to bring out a high surface luster, polishing is followed by buffing. This differs from polishing in that the abrasive is embedded in a grease binder and is rubbed on instead of being glued to the wheel. Tripoli powder is the most common buffing agent; for convenient use it may be mixed with grease and the mixture molded in cake form, which is applied by simply holding the cake against the revolving wheel.

Buffing wheels must be properly selected, and abrasive of the proper

(*Continued on page* 216)

FOR ENDURANCE AND LONG LIFE BUY SPO MOLDING MACHINES

YOU CAN'T BEAT SPO'S FOR SERVICE
SPO No. 200 Series Molding Machine, CANTILEVER type.
SPO No. 200 Series Molding Machine, POST type.

It's SPO's Exclusive *Inverted Jolt* that Makes the Difference!

More and more, foundrymen all over the country are acclaiming the superior operation of the SPO inverted jolt unit. They have learned from pleasant experience that it makes better molds, makes better molds faster and stands up longer under today's strenuous production requirements.

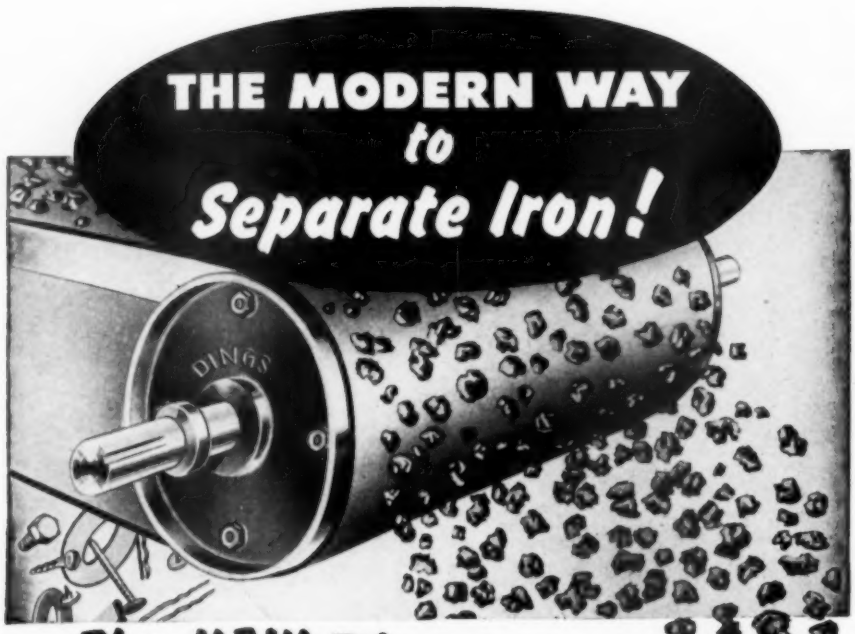
MEMBER

Always find out what SPO has to offer.

SPO INCORPORATED

Manufacturers and Specialists in Molding Machines, Vibrators and Patterns for Production

7500 GRAND DIVISION AVENUE · · CLEVELAND 5, OHIO



The NEW Dings
ALNICO MAGNET
PERMA·PULLEYS*

For: Separation of Ferrous and Non-Ferrous Scrap
Removal of Iron from Foundry Sand

• No wiring . . . no electrical accessories . . . no operating cost . . . no maintenance . . . good for life . . . tremendous power . . . completely automatic

The new Dings PERMA-PULLEY is a revolutionary contribution to magnetic separation. You can install it and forget it!

Backed by 50 years of magnetic separator manufacturing experience, this new pulley offers these plus features that assure you of maximum tramp iron removal:

- **Extra high strength grade of Alnico**
- **Closely spaced poles**
- **Magnetic strength equal across entire belt width**
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(*Continued from page* 214)

fineness must be used for best results with aluminum. Hard buffs have better cutting qualities than soft ones, but have greater tendencies to form pits or streaks. If these difficulties are experienced a softer buff should be used. More lubricant is required for buffing aluminum than for harder metals, and generally lower pressures against the buff. Experience is the best guide to the proper equipment and technique.

The final polishing operation is known as coloring, which actually does not change the color of aluminum but produces a characteristic high gloss. Cleaning in benzene and drying in sawdust precedes the operation. Castings sometimes are also given a light caustic etch between buffing and coloring, especially if an anodic oxide coating is to be applied later. Wheels for coloring are usually muslin or flannel, similar to soft buffs, and the abrasive soft silica mixed with grease.

Blast Cleaning—Blasting provides an excellent means of cleaning aluminum castings and, at the same time, of imparting a uniform matte surface of pleasing appearance. Surface discoloration, minor surface roughness and roughness from rough grinding operations can readily be removed or masked by this method. Hence this treatment often follows the rough grinding or polishing operation, instead of the polishing and buffing procedures. In addition, any unsoundness just below the surface usually is revealed by blasting, which makes the method valuable from the standpoint of final inspection.

Sand of various sizes, grit or shot may be used in blasting treatments, depending on the desired surface. Shot blasting produces a peened type of surface and is particularly effective in removing burrs. Because of its roughness, a plain sand blasted surface fingerprints easily and collects and retains dirt. Therefore, a coat of lacquer or clear varnish sometimes is applied to aid in keeping such surfaces clean. In addition, sand blasting treatments often are followed by anodic oxidation finishes. Equipment for blasting operations is much the same for aluminum as for other metals.

Highlighted Finish — By applying one type of finish to the raised portions of a casting and a different finish to the recesses, a highly attractive effect is obtained. This is known as a highlighted finish, and it is particularly well adapted to spandrels and other decorative castings. Raised areas are highly polished by buffing or coloring, and

(*Continued on page* 218)

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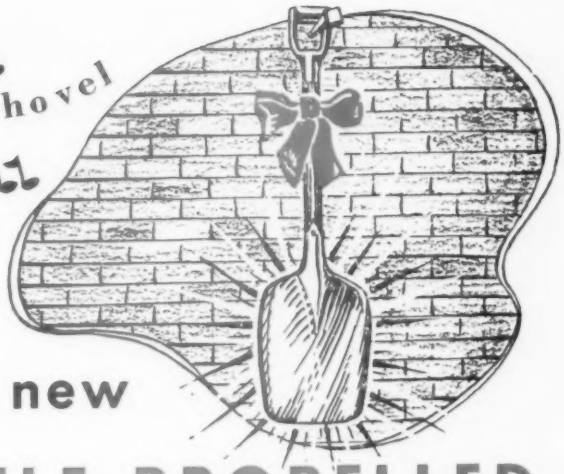

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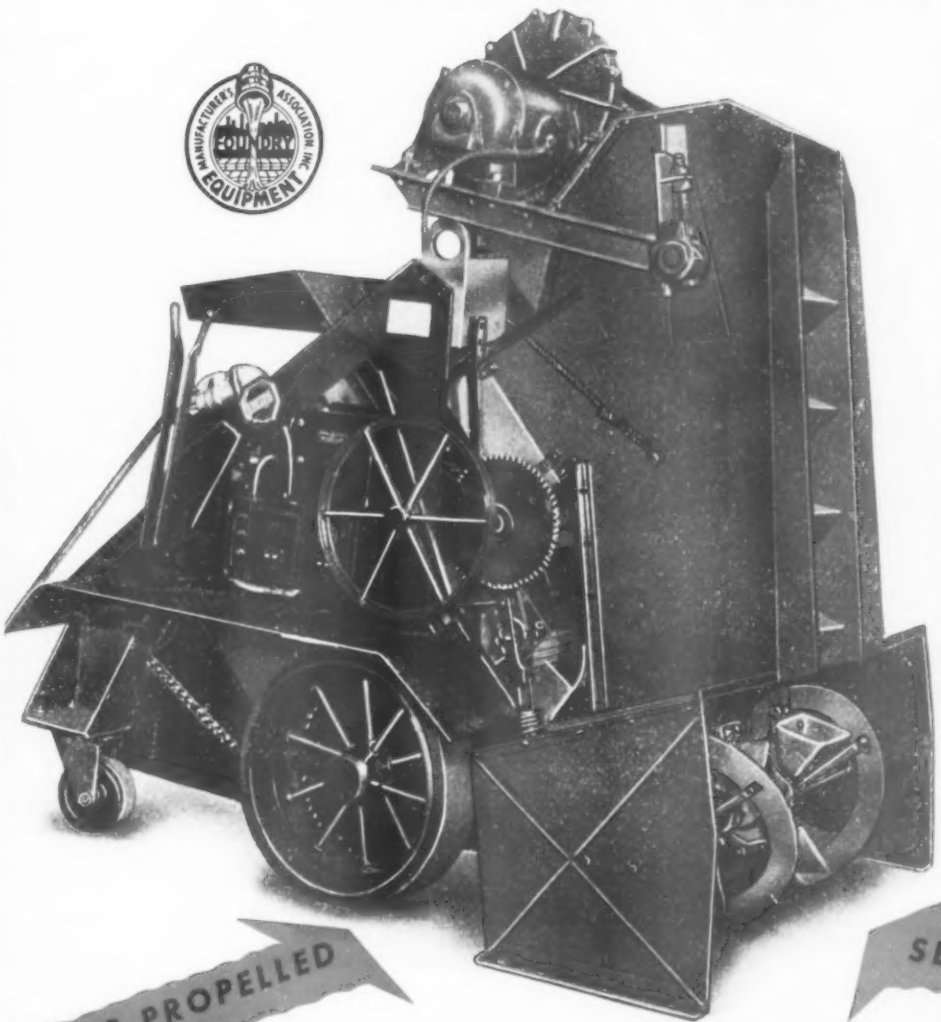

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(*Continued from page* 216)

recesses are usually sand blasted.

Raised areas are protected by some sort of adhesive covering while the background is blasted. If anodic oxide treatment is to follow, the casting is next given a caustic treatment to provide a light etch on the background. The background then is protected by adhesive covering or by painting while the highlights are buffed. Anodic oxide treatment, which provides permanent protection to the entire casting, follows as the final operation. Pigments or dyes may be added during this process if a colored surface is desired.

Scratchbrushing and Satin Finishes—By application of a rotating wire brush to aluminum castings, a coarse-lined surface is obtained. Fineness of the finish is determined by the size of wires in the brushes, wires of 0.015-in. diameter commonly being used. This type of finish usually is applied after blasting.

Satin finish is similar to scratchbrushing except that a finer brush or abrasives are used. Wires from 0.002 to 0.005-in. in diameter are most often used, and a variety of effects can be obtained by varying the angle of contact of the brush. Satin finish is applied to castings following a buffing or coloring treatment. A very fine satin finish may be obtained by the use of a fiber brush or by hand rubbing with a paste of pumice and oil.

Chemical Finishes—Surface effects not possible by mechanical means may be produced chemically, usually at low cost. Decorative coatings resistant to corrosion, but not particularly resistant to abrasion, can be produced in this manner. These finishes include frosted and diffuse reflector finishes, chemical etching, and the Alrok finishes (patented finishes developed by Aluminum Co. of America).

Frosted finish is produced by first treating in a caustic solution, followed by rinsing and immersion in an acid solution. The parts are then rinsed again and dried on a steam table. The Alrok finishes are both decorative and protective and may be colored by a variety of dyes. They are less resistant to corrosion and abrasion than anodic oxide coatings, but cost less. Both frosted and Alrok finishes are especially adapted to the treatment of small castings and are not used extensively for larger parts. The other chemical finishes mentioned are applied mostly to wrought aluminum products.

Electrochemical Finishes — Oxide coatings applied to aluminum surfaces by anodic treatment are perhaps the most versatile of all the various types of finishes available. They are resistant to atmospheric corrosion, wear and chemical attack. They may be impregnated with a number of dyes or pigments to provide a variety of colors. They form an excellent base for paint, lacquer or enamel. They have a hard smooth surface that does not collect dust.

Like electroplating, the method involves treating the parts in an electrolyte. Unlike electroplating, however, the parts being treated are connected to the anode of the electric circuit instead of the cathode. Passage of the current through the electrolyte thus deposits oxygen on the parts being treated instead of a metal as in plating. The oxygen attacks the aluminum surface, producing an oxide coating of increased thickness which is integral with the surface of the metal being treated.

Thickness and other characteristics of the coatings may be varied over a wide range. The coatings as formed may be clear, translucent, or opaque. Some alloying elements confer characteristic colors on the coatings, generally gray or brown tints. The coatings reproduce the texture of the surface on which they are formed; they will thus preserve the appearance of the various mechanical finishes when applied after those finishes.

As initially formed, the oxide coating is filled with fine pores, too small to be seen by the naked eye. Because of their porous nature, the coatings thus will absorb a number of agents which impart to them a variety of properties. Sealing treatments make the coatings resistant to staining. Corrosion inhibitors such as chromates increase the corrosion resistance. Dyes and pigments may be absorbed during certain stages of the process to provide a variety of colors. Corrosion inhibitors usually are employed when the coatings are to serve as a base for paint or enamel.

Perhaps the most thoroughly developed finishes of this type are those applied by the Alumilite process, developed and patented by Aluminum Co. of America.

Electroplating—Unlike other metals, aluminum seldom is electroplated for protection; but it often is plated to produce an attractive finish or one having higher resistance to wear. Chromium, nickel, copper, brass, silver, gold, and oxidized modifications of these elements all may be applied to aluminum. Silver is applied to electrical equipment to decrease contact resistance, or to improve surface conductivity. Brass facilitates vulcanization of rubber. Copper permits assembly by soft soldering. Heavy chromium deposits reduce friction and increase wear resistance. Chromium applied directly provides considerable resistance to alkali corrosion. Zinc also increases corrosion resistance under some conditions.

The "zinc immersion" process is the one most generally used in plating aluminum, and the required equipment is about the same as that used for plating on other base metals. In this process a coating of zinc is formed chemically on the aluminum surface and this serves as a bond for other deposits. The most common plated finish comprises successive deposits of copper, nickel and chromium. Brass, iron, silver, or chromium may also be applied directly over the zinc coating. When

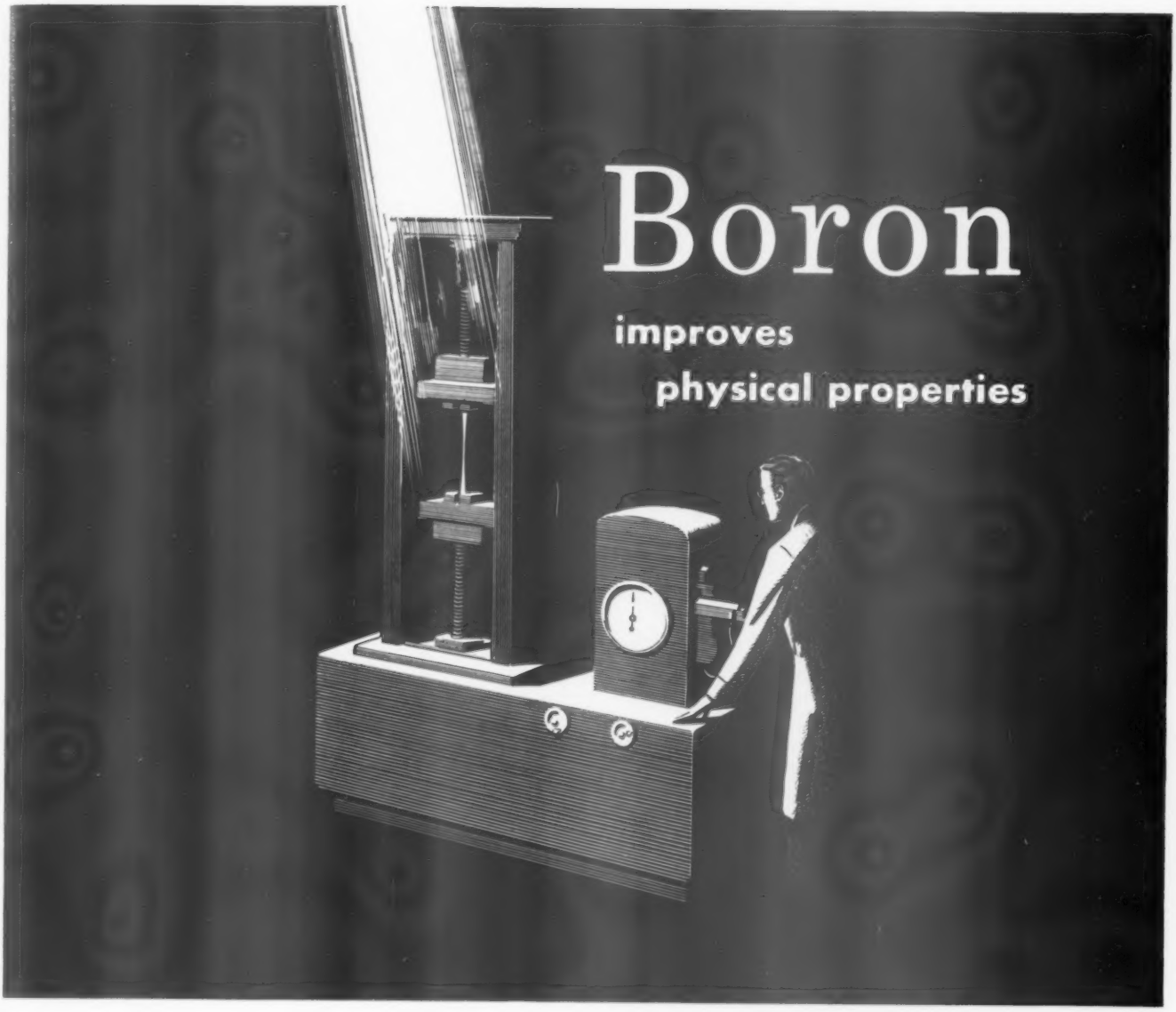
(*Concluded on page* 220)

Olympic Torch

ON July 29 when the king opened the Olympic Games at Wembley, an English runner entered the stadium carrying a lighted torch. He was the last of a series of runners from Greece, Italy, Switzerland, France, Luxemburg and Belgium who had carried the flame, day and night, 3000 miles from the village of Olympia in Greece to London.

Each runner was supplied with a torch designed and manufactured in England from Hiduminium, a durable and noncorrosive aluminum alloy developed by High Duty Alloys, Slough. The die cast bowl of each torch, left rough and inscribed "OLYMPIAD 1948: Olympia to London 1948," was decorated with the Olympic symbol of five intertwined circles and was fitted to a well-balanced, polished shank.

A napthalene pellet container fixed in the head provided the "Olympic" flame. The completed torch, eighteen inches in length, weighed only 3 lb.



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(*Concluded from page* 218)

properly applied, these coatings will not blister when heated, and their adherence exceeds the cohesive strength of the base metal.

Other plating methods start with a porous anodic coating as a base. Zinc may also be deposited directly on aluminum from a standard cyanide solution. Because of the unfavorable solution potential of aluminum with respect to plating metals, plated aluminum should not be used in a corrosive environment unless the coating is heavy enough to be impervious—about 0.0015 in. of nickel.

Paint, Lacquer and Enamel—In many instances the use of paint, lacquer or enamel constitutes the most economical means of obtaining the desired decorative effect; in others it is necessary for protective purposes. When paint is to be used only for decoration, very little surface preparation is needed. It is only necessary to be sure that the surface is clean. Often a thorough cleaning with a solvent is sufficient. When paint is required for protection, however, greater precautions must be observed in the preparation of the surface, as with other metals.

One of the most effective of the simple chemical treatments employs a dilute aqueous solution of phosphoric acid. Inhibited alkaline cleaners also are used, but they are usually followed by a dilute acid treatment (chromic or phosphoric). For severe exposure conditions, the chemical and anodic-oxide treatments, as described previously, provide excellent bases for paint. After cleaning or other surface preparation, the metal must be thoroughly dried before paint is applied. Castings always are dried by heating.

Selection of the proper primer is one of the most important single steps in painting aluminum. Of the various commercial primer pigments that are suitable, zinc chromate has been found to have the highest corrosion-inhibitive properties. For less severe exposure, any of a wide variety of commercial primers may be used, including aluminum paint. Once the surface has been primed, almost any durable exterior paint, enamel, or lacquer may be applied. Any of the standard methods of application may be used—brushing, spraying, or dipping.

Editor's Note: Previous articles in this series discussed aluminum alloys and their characteristics, sand conditioning and molding, melting and pouring, casting design, permanent mold practice, and heat treatment. Succeeding articles will cover inspection and quality control.

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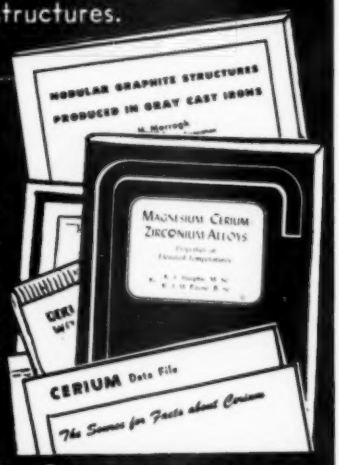
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Foundry Practices

in the

THE Department of Operation and Maintenance of the Panama Canal operates a foundry at the Mechanical Division shops in Balboa, Canal Zone, on the Pacific side of the Isthmus, for the purpose of producing castings for the several departments and divisions of the canal, the Army and Navy, and the Panama Railroad. A great many castings are also produced for ships transiting the canal, many of which arrive at canal ports in damaged condition and are unable to proceed further until repairs are completed.

Other activities which are served by the Balboa foundry include government and private interests in the Central and South American republics which have no foundry facilities of their own. The urgency of some of the work often makes it necessary to use a broken machine part for a pattern, and a great many patterns are made, from which only one casting is produced. The cost of some of the castings under such conditions naturally is high.

Covers All Branches

The foundry is equipped to produce all kinds of castings in steel, iron and nonferrous metals, and all pattern requirements are taken care of in a well equipped pattern shop. Melting facilities consist of two cupolas lined down to an inside diameter of 42 in. and a smaller cupola lined to a 24-in. inside diameter; two side-blown bessemer converters each capable of producing 4000 lb of steel in one blow; one small rotary electric furnace, and three oil-fired crucible furnaces for the production of nonferrous castings. The cupolas are equipped with instruments for air weight control and the converters have electronic instruments for control of the blow.

Many difficulties arise both in melting and in keeping instruments and gages working satisfactorily because of the extremely high moisture content of the air. Recently an acid-lined electric arc furnace with a rated capacity of 1000 lb per hour was installed for use in the production of both steel and cast iron. Another similar furnace with a rated capacity of 3 tons per hour is ready for installation. A main extension to the foundry, together with new storage facilities for patterns, is now under construction; and provisions have been made for setting up a metallurgical laboratory.

Some Materials Imported

A natural bonded sand for gray iron molding is obtained locally, but washed silica sand for steel molding and natural bonded sand for the nonferrous molding must be obtained from the United States. Coral limestone of good quality is also available locally and is used as a flux in the melting operations. As pig iron and coke must be imported from the United States, the delivered cost of these items is very high. Iron and steel scrap, however, is procured locally at low cost; and because the electric furnace is utilizing a 100 per cent scrap charge, with the exception of a small amount of pig iron which is needed for the adjustment of the carbon content, the cost of electric furnace metal is not excessive. Electric power on the Isthmus compares favorably in cost with the lowest power rates in the United States.

An outstanding example of a difficult job accomplished with the available equipment in this foundry is shown in the accompanying illustrations. The casting is a cutter head for the *Dredge Mindi*, weighing about 35,000 lb with feed heads and gates and about 27,000 lb finished for use but without teeth. This cutter head was designed locally and the pattern was made in the local pattern shop. Similar castings have previously been produced in the Balboa foundry, but the old practice was to make the casting in two halves and then join the parts by welding. This procedure did not prove very satisfactory, however because of the difficulty in fitting the two parts and the high cost of setting up the work for welding. Warpage of the two parts in the casting and heat-treating operations could not be avoided, making the matching of the two parts before welding very difficult.

The problem of melting 40,000 lb of steel, which was the calculated weight of hot metal necessary to pour the casting, was not an easy one. Only two 4000-lb capacity side-blown converters were available to do the job and ten blows were necessary before enough metal was available to pour the casting. The converters were blown simultaneously, and each finished heat was poured into a holding ladle, which was kept hot by the use of a regular oil-fired ladle drying burner. The ladle had to be kept under fire for about 3 hours before enough metal was accumulated to pour the casting.

Ladles Poured Simultaneously

The metal was then transferred to a bottom-poured ladle which was filled to capacity, and the remaining metal, about 5000 lb, was poured into a smaller, lip-poured ladle. Both ladles were then poured simultaneously into the mold. The metal temperature remained high enough during the long holding time to pour the casting without any difficulty, and the chemical composition of the metal indicated that no harm was done in spite of this unusual practice. Drillings from the casting had the following chemical composition: C 0.30 per cent, Mn 0.81 per cent, P 0.037 per cent, S 0.045 per cent, Si 0.50 per cent.

The following physical properties were obtained in an annealed test bar from the casting: Yield strength 46,800 psi, tensile strength 78,600 psi,

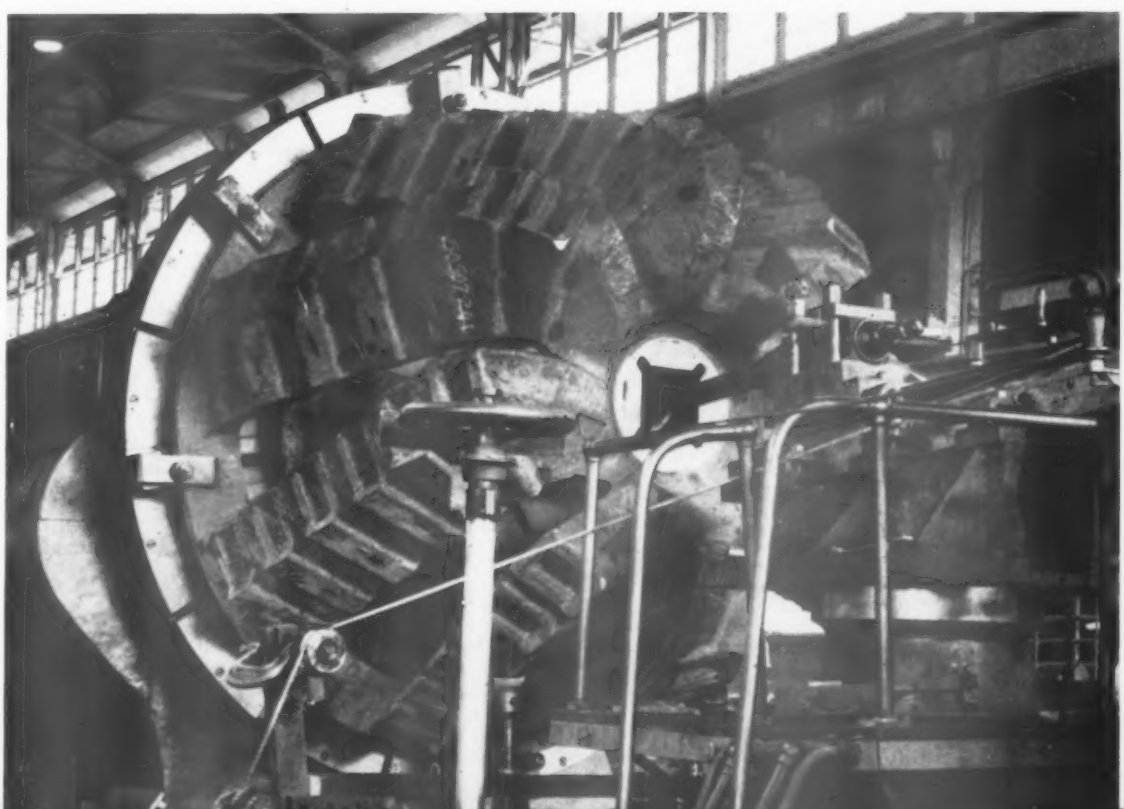
By CARL H. ROWSING
Metallurgist
Mechanical Division
The Panama Canal

IN THE TROPICS

elongation in 2 in. 26.8 per cent, reduction of area 46.9 per cent. These properties indicate that the metal was of excellent quality and that carefully made side-blown converter steel compares favorably with steel produced by any other method. The supposed notch brittleness of converter steel did not have to be taken into consideration for this application, and the nonmetallic inclusions were found to be not excessive.

Skilled workers from the United States are used for the molding and melting operations and for pattern making, but all other work in the foundry is performed by local labor.

Right—Steel cutter head casting made at Balboa, Canal Zone, for a dredge



Below—The cutter head set up for machining. Finished weight was 27,000 lb

DESIGNING CASTINGS IN GRAY IRON

(*Continued from page* 101)

meet the demands of the designer. Some idea of the decrease in volume taking place in cooling of gray iron from the liquid state to room temperature can be obtained from Fig. 1. Of this total shrinkage, that occurring on a change from the liquid to the solid state is of first concern to the foundryman.

Because of liquid to solid shrinkage, uniform section thickness, as illustrated in Fig. 2, is a cardinal principle in good casting design. Failing this, at least a progressive increase in section thickness to a location where a riser or feeder can be placed is essential. The result of an extreme case of poor design is shown in Fig. 4. Here an unfed, heavy section has remained fluid (a so-called hot spot) during the more rapid contraction and solidification of the thinner section. Metal has been abstracted from the still liquid, heavy section to feed the contracting thin section leaving behind a cavity or porous spot in that area.

If the design necessitates such a drastic section change, the casting design must be such as to permit attachment at that point of a feeder or riser (external reservoir of molten metal) by the foundryman. By continuously supplying liquid metal to the hot spot, the formation of a cavity will be avoided.

This condition is particularly aggravated if a design is set up so that a heavy section must be fed through a thin section without the possibility of providing an outside reservoir of molten metal attached to the heavier part. In such cases the foundryman is driven to the use of chill or denseners in an attempt to equalize the cooling rate of the two sections, with a consequent increase in cost and possible sacrifice in quality of the casting. Very frequently a minor alteration in a cast part will avoid a situation of this type and may incidentally result in a decrease in weight, with no sacrifice in functional efficiency. A few examples of common means of avoiding hot spots are illustrated in Figs. 3 and 5.

Avoid Sharp Corners

Stress analysis has demonstrated the desirabiilty of avoiding sharp corners at adjoining sections in any engineering structure, and foundry experience has likewise shown that, if possible, sharp inside corners should be avoided regardless of the type of cast metal employed. The use of generous fillets at these locations both facilitates directional solidification, i.e., progressive solidification to a central location that can be adequately fed, and materially decreases stress concentration resulting from contraction of the casting as it cools from solidification to room temperature. Fig. 6 illustrates some of the means by which the adverse effect of sharp corners can be prevented. It might be noted that although generous fillets are indicated in any design (½-in. to 1-in. radius) they should not be so excessive as to promote a hot spot in joining sections of equal or approximately equal dimensions.

Some consideration should also be given to the possible development of internal stresses arising from the delayed solidification of heavy sections as opposed to light sections, particularly in an enclosed or rigid cast structure where normal contraction on cooling is hampered. Both liquid and solid contraction—with the consequent tendency toward hot-tearing—are less severe in gray iron than

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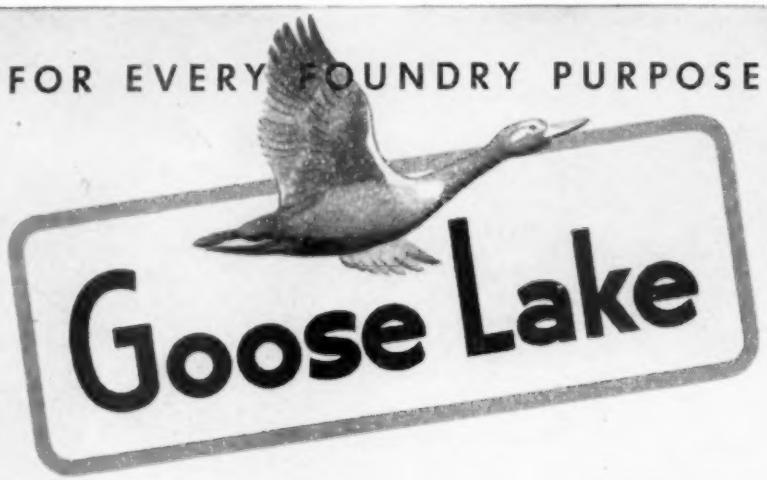

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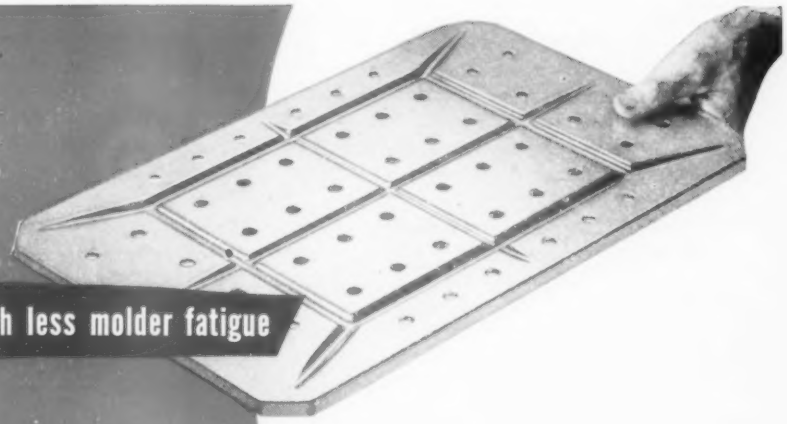

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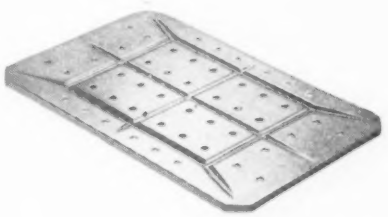

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(*Concluded from page 224*)

in steel and certain nonferrous alloys, but extreme conditions can exist where such types of failure will take place. Elimination of stresses is, in fact, one of the strongest arguments for the use of as uniform sections as possible.

A familiar example of poor design is a wheel with a heavy hub and comparatively thin spokes as shown in Fig. 6A. The use of curved spokes or spokes of a wave-form cross section, as illustrated by Fig. 6B or Fig. 6C, are classical remedies for the original faulty design. Actually, sound cast iron wheels have been produced without recourse to either of these remedies when the design demanded it. The foundryman must, however, be given freedom to proportion the section sizes of rim, spokes and hub so as to reduce stresses to a minimum.

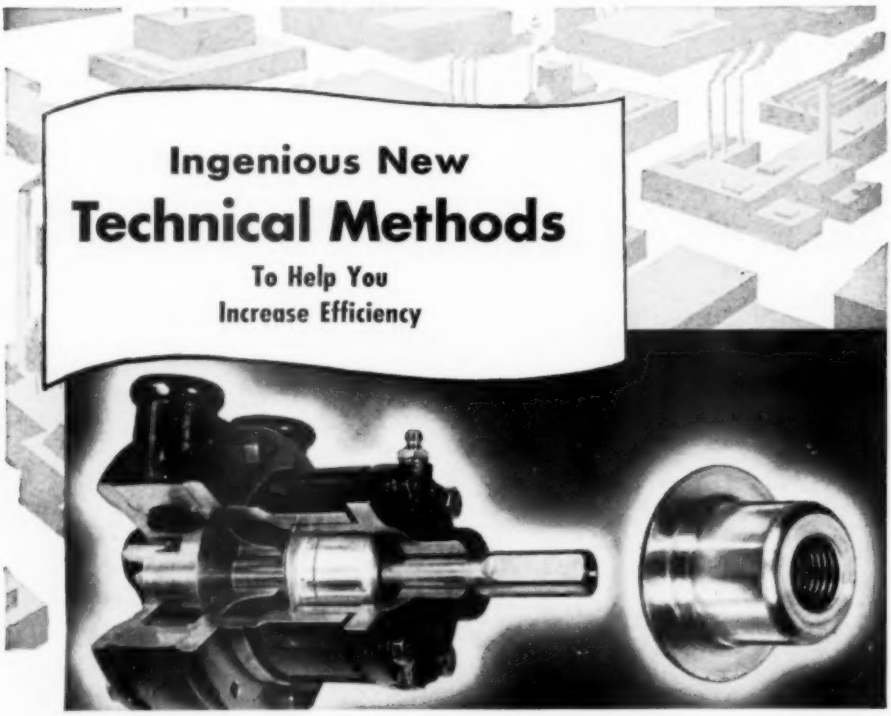
The designer should certainly not be burdened with details that are primarily in the province of the foundryman. Consequently, unless the designer has foundry experience, preparation of the final pattern for the casting should logically be left to the foundryman or a foundry engineer. If this is done, assurance can be had that the pattern will include essential factors, such as proper layout to allow for liquid feeding, adequate allowances for liquid and solid shrinkage, proper allowance for machine finish and accurate spacing of location points to be used by the machine shop, provision for cores and their anchoring if necessary, avoidance of irregular parting lines, and sufficient draft to permit ready removal of the pattern from the molding sand. Such factors are, of course, essential to economical production of castings which will meet the designer's specifications.

The present article has failed in its purpose if it has created the impression that design or production of gray iron castings is a difficult matter. As already indicated, gray iron, because of its low melting point, extended solidification range and comparatively low shrinkage is uniquely adapted to the production of both simple and intricate castings. Starting with a material whose strength, fluidity, and shrinkage can be controlled by variation in base analysis, the experienced foundryman is accustomed to meeting the exacting specifications of a designer as a matter of routine. It cannot be overemphasized, however, that in the casting field, as in any other fabricating field, maximum economy and serviceability of a finished part can only be achieved by the co-operative effort of the designer and producer.

Sources of Illustrations

Figs. 1, 4, 7—John W. Bolton, *Gray Cast Iron.*

Figs. 5, 6—C. W. Briggs, *Steel Castings Handbook.*



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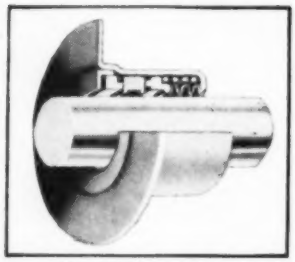

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Lists Scientific Periodicals

A list of scientific and technical periodicals in the libraries of greater Cincinnati was published May 1. It lists the holdings of 58 public and industrial libraries, and contains 3200 titles and more than 10,000 separate entries.

The guide was sponsored by the Cincinnati Section of the American Chemical Society, and consists of 125 double column pages, lithoprinted, and is bound in durable paper. It will be sold for $2.50 postpaid. Compiler and editor is Bernard Gessiness, department of chemistry, University of Cincinnati. Book may be obtained through Dr. R. E. Oesper, department of chemistry, University of Cincinnati, Burnet Woods Park, Cincinnati 21.

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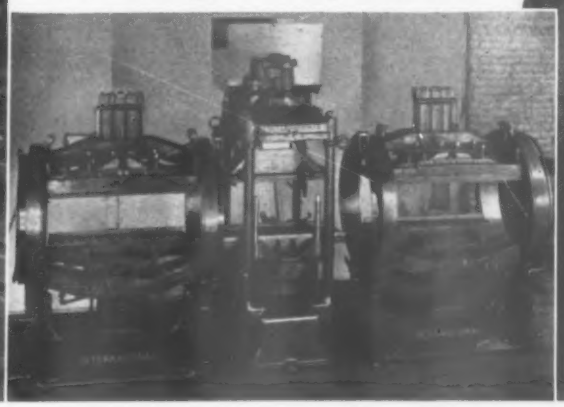


CASTING STEEL CENTRIFUGALLY

(*Continued from page 77*)

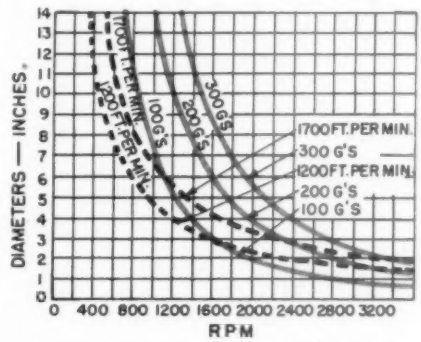
down rollers is mounted above the flask, but they need not make contact with it, and their function is chiefly to keep the mold from flying off its supports in case anything goes wrong. In early designs, these rollers were arranged to press down on the driving tires, and were intended to prevent an unbalanced mold from vibrating. It was soon found, however, that an unbalanced mold cannot be held steady in this way, and that when these rollers bear down on it the only result is that the whole machine will vibrate, making it impossible to maintain the desired speed.

In some machines, instead of mounting the flask itself on the rollers, an outer shell was used, and the rammed-up flask was slipped inside this shell and centered by suitable devices, such as a set of three or four heavy setscrews at each end. These designs, however, only led to difficulty in preventing vibration at the necessarily high rotating speeds of these machines, and have for the most part been abandoned in favor of heavier flasks mounted directly on the driving rollers. Even with this design it is not always easy to avoid vibration, and it is advisable to check the flasks at intervals on a dynamic balancing device and compensate by re-machining for any lack of balance found.

The steel is practically always poured into the molds from one end only, though it would perhaps be possible to use two pouring devices and thus produce a longer casting than could be "run" from one end. Where the two bodies of metal meet, however, there would probably be an area of rough metal and possibly trapped dirt. In some cases, even, a cold shut would be formed, due to the oxide coating on the steel, as there sometimes is in statically poured castings where the flowing metal runs around a core and fails to knit properly beyond it as the two streams meet.

To promote free escape of the air inside the mold, the holes in the cores that close the ends should be as large as possible. When thin-walled tubes are being made, a large opening can be used without difficulty. In pouring pieces with thick walls, however, the diameter of the hole in the core at the end opposite the pouring device must not be too large, because the steel often flows rapidly along the mold and hits the end core quite hard. In that case some metal is apt to splash out if a large opening is used. At the pouring end the hole in the core is made as large as possible, in order to facilitate the introduction of the metal. Whenever pos-

Correction



Incorrect register of color during printing produced an error in chart reproduced as Fig. 1 appearing with Mr. Hall's article on page 76 of the August issue of THE FOUNDRY. That chart is reproduced correctly above and shows centrifugal casting speed curves according to Zuehlke

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sible, the spout of the pouring device extends through this hole into the mold and the steel strikes the sand lining at a little distance from the end and at a low angle.

The pouring device through which the weighed amount of steel is fed to the mold is built like a small ladle, with a horizontal extension at the bottom. In order not to trap any metal, the inside of the lining is made to slope evenly down to the beginning of the horizontal part. If the pouring spout extends through the closing core in the end of the mold, it may be made with a rammed lining, or with a tubular core slipped into it from the front. In pouring tubes with a small inside diameter, however, the spout cannot be made small enough to extend into the mold, and the steel must be squirted through the end core.

Use Aluminum Disk

In this case, some method must be provided to hold back the metal until the pouring device is full enough to give the "head" that is needed to shoot the steel to the required distance. Usually this is accomplished by making the spout in two pieces which clamp or screw together, with an opening in the refractory lining at the joint, which is closed by means of a sheet of aluminum. The thickness of this sheet is such that it will not melt through until there is enough steel in the reservoir to give the required "head." A stopper and nozzle such as are used in bottom-poured ladles can be built into the pouring device, and in some foreign installations this design has been adopted. It is more expensive than the aluminum plate arrangement, however, and not as easy to install.

From the point of view of the formation of shrinkage cracks, the rate of pouring and spinning in sand-lined molds is not as critical as when all-metal molds are used. This is in part because the steel necessarily freezes more slowly against a sand lining, and thus as each layer solidifies it is able to expand until it fits the mold and maintains contact with it. Probably a more important factor is the expansion of the silica sand of the lining, which is sufficient to compensate for the contraction of the casting, more especially as the flask is not at first heated very much and therefore expands far less than when the steel is poured directly upon it. Thus the sand lining supports the first frozen layers against the pressure of the unfrozen liquid metal, and there is little tendency to form tears.

As the steel freezes more slowly against a sand mold than against a metal one, however, it does not so readily pick up rotational velocity, and a sand-lined mold must be spun faster for a given diameter than a metal mold. If the steel is fed into the mold cavity much faster than it can acquire rotational velocity, it lies in the bottom of the mold in a lake or pool. This pool of metal soon grows so deep at the entering end that a wave is formed which rushes to the far end of the mold, and tends to splash out of the hole in the closing core. At times, this wave even rebounds and runs back down the mold, to splash out around the pouring spout. This condition naturally is worse in pouring thick-walled tubes than when only a thin casting is being made.

If the desired inside diameter of the casting is too small to permit the pouring spout to extend through the hole in the closing core, so that the metal must be squirted into the mold, the only way to avoid this difficulty is to use a very small orifice in the spout. If the temperature of the steel is high, this is perfectly feasible, but

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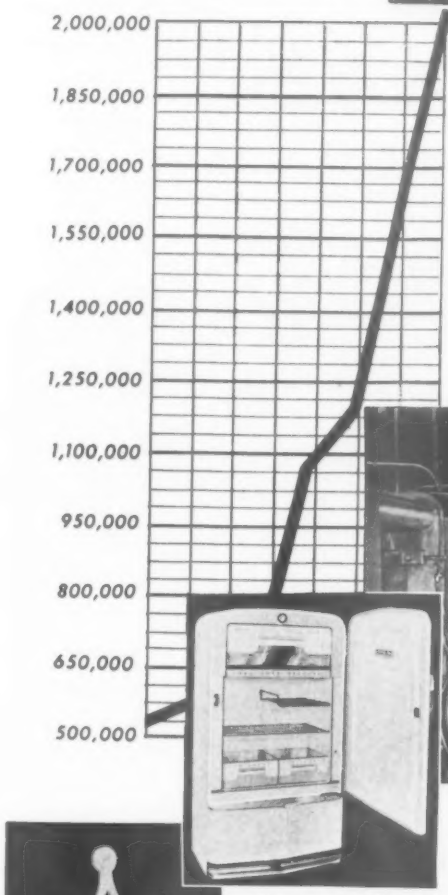

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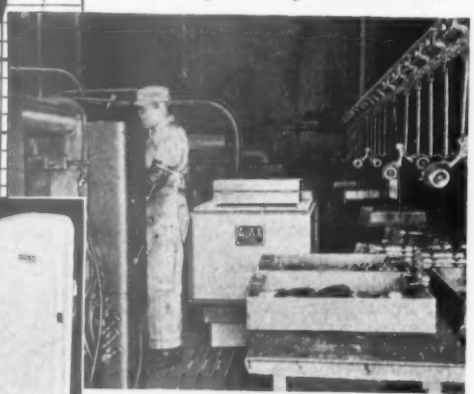

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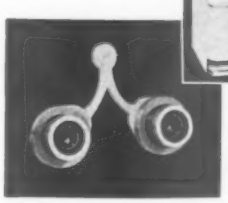

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colder metal will sometimes freeze up and close the passage in the pouring spout before all the steel has been poured into the mold. In general, either electric furnaces or converters should be used to make the steel for true centrifugal work, because with them it is easy to secure steel hot enough to run through the small openings frequently required in the process. Open-hearth steel generally is not hot enough for the purpose, and cannot be handled except with bottom-poured ladles which further lower the temperature of the metal delivered to the pouring device of the casting machine.

With sand-lined molds, the solidification of the steel in tubes of heavy or medium wall thickness takes a fairly long time. As a rule it is not possible to remove one mold from its rollers and substitute another in time to pour both from the same ladle of steel. Therefore, enough machines must be provided to take all the steel it is desired to pour from any one furnace heat. If some of the steel can be used to pour regular foundry molds, that is not a serious matter, but if special steels are being made that are to be used only in heavy centrifugal castings, the machines must be of sufficient capacity to take the whole of a heat of steel at one pour.

There is a definite lower limit to the inside diameter of tubes that can be successfully made in horizontal molds. If the steel could be poured in slowly enough, the inside diameter could be made nearly as small as that of the stream issuing from the pouring funnel. However, the hole in the core at the pouring end must be a little larger than the stream, to permit the metal to enter the mold cleanly, and of course the inside diameter of the casting can be no smaller than that of this hole. Actually it must be slightly larger, because it is virtually impossible to pour the steel in slowly enough so that it will all start to rotate without piling up at the bottom of the mold and running out the hole in the core. Therefore, the mold cannot be filled so full that the diameter of the hole in the casting is exactly the same as that of the hole in the end core.

Has Numerous Advantages

In the mass production of cylindrical castings of ordinary steel, the chief advantages of the true centrifugal process are the high yield attained and the possibility of making thin-walled tubes free from centerline shrinkage. In addition to this field for the process, the method has been generally adopted for the manufacture of tubular products of various high-alloy steels which are difficult or impossible to form into tubes by forging, piercing and drawing. For this work, the advantages of the true centrifugal process are so marked that it is the preferred method of manufacture, even though only a few castings of each size are to be made. The unit cost of the product in this case may be high compared with what might be attained in mass production, but still will be much lower than the cost of piercing and drawing. For some of the very highly alloyed steels that cannot be pierced and drawn at all, centrifugal casting is obviously the only practicable process of forming tubes.

By welding together several lengths of centrifugally cast tubing, pieces are produced that are far beyond the possibilities of the casting process alone. Flanges and other parts are also applied to the tubes by welding. Even in some cases, longitudinal, transverse or inclined ribs may be formed on the outside of the castings.

(*Continued on page* 232)

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(*Continued from page* 230)

As a rule, however, this necessitates the use of cores slipped into the flask instead of a rammed-up lining and increases the cost of production considerably.

In a few cases the method of using cores set in a supporting flask or frame has even been applied to the manufacture of castings in which the main tube carries extensions on one side only, so that normally it would be quite out of balance. To make these pieces, extra portions of the supporting frame were added to bring the whole assembly into balance, once the mold was filled with steel, though of course before pouring it could not be balanced. The cost of such special equipment necessarily is so high as to restrict the applicability of this method to cases where the orders call for a great many castings of a single size. This practice was described briefly in a paper presented by E. C. Jeter[5] before the National War Material meeting of the Society of Automotive Engineers, in June, 1944. Figs. 6 and 7 are taken from that article and show a casting made by the method and a cross section of the dry sand core used.

In some European foundries, tubes up to some 16 ft long have been poured successfully in horizontal metal molds, lined with loose silica sand in a layer about 2 to 5 mm thick. The flasks used are quite thin, and run in a bath of water, like those used in the production of cast iron pipe by the de Lavaud method. The loose sand is spread evenly along the revolving mold by means of a trough introduced through the end, and then tipped over so as to place all the sand at once. Centrifugal force, of course, holds the sand in place until the steel is run into the mold. To guard against washing off the sand in pouring, the steel is fed into the mold as nearly as possible in a horizontal stream, while the machine is running at full speed. With the proper combination of sand thickness, metal temperature and pouring rate, tubes are produced that are entirely free from cracks or from sand washed off by the flowing metal.

Semi-centrifugal Process

Once the sand has been fed into the mold, it will stay in place only if the machine is kept spinning. The trough used to put the sand in, therefore, must be small enough to pass through the hole in the closing core, as the latter has to be placed before the mold is started spinning. Heavy walled tubes of comparatively small diameter, which can be poured only by the use of closing cores with small openings in them, cannot be made by this method, because the sand trough could not be introduced into the mold through so small a hole.

Semi-centrifugal process is used to make castings of circular outline, either annular like sprocket rims, tires, etc., or connected to a hub by spokes or a solid plate, as in gear blanks, wheels, rotor castings for turbines, and similar pieces. It differs from the true centrifugal process chiefly in that the entire outline of the piece to be made is formed by the sand of the mold or cores, and the molds are always spun on a vertical axis. The molds are made with a cope and drag, or of cores set one on top of another, the joints naturally forming a weak point in the completed mold. The method is supposed to enable the foundryman to secure a much higher yield of good castings than is possible in regular foundry practice, and at the same time to produce sounder castings.

In addition, pieces with sections too thin to be readily "run" in a

(*Continued on page* 234)

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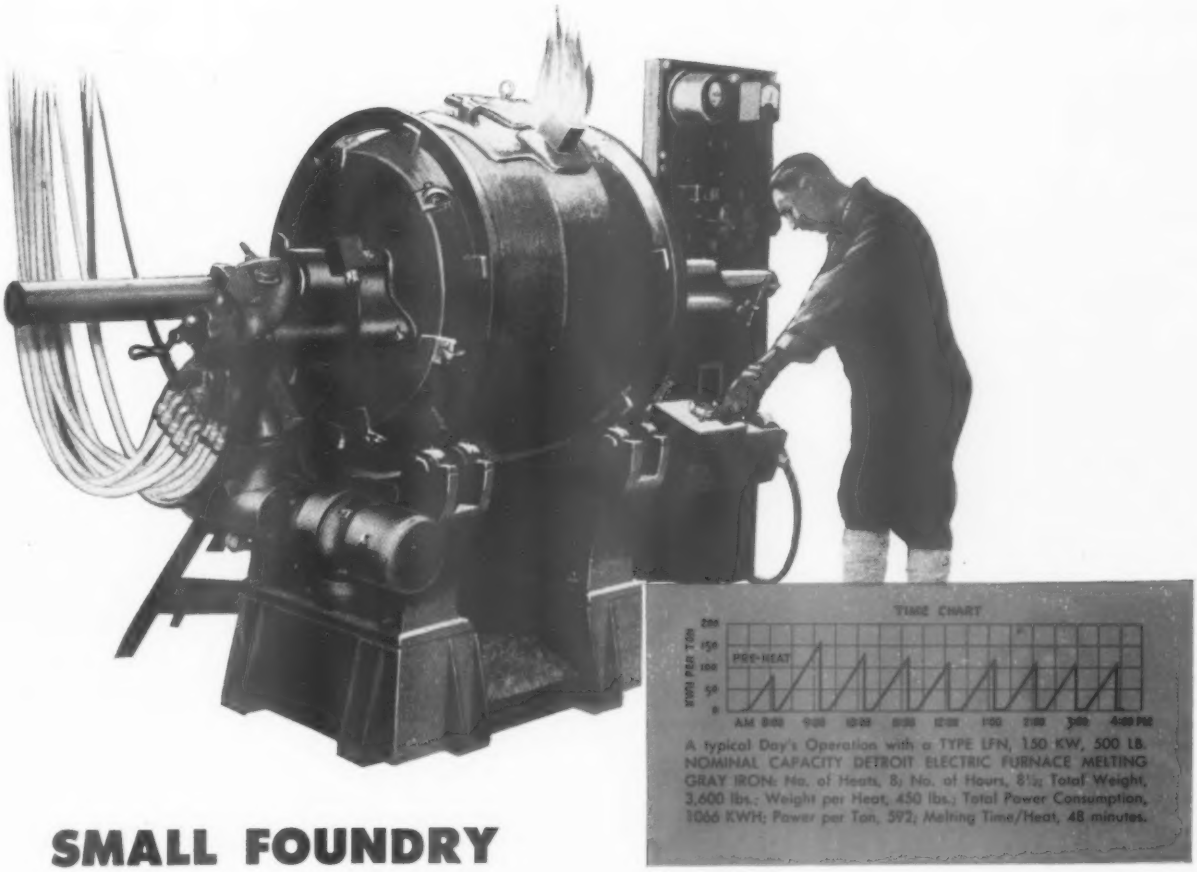

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(*Continued from page* 232)

stationary mold may be produced successfully by spinning. High yield is undoubtedly secured in the production of suitably designed castings of small and medium size. Improved soundness, however, cannot always be attained, and actually in certain instances exactly the reverse may be true. The method has been used by a number of concerns for the production of castings having sections too light to be produced statically. Some authorities even consider that such pieces are the only ones that should be made semi-centrifugally, and believe that there is no advantage in spinning a casting that can be made by regular foundry methods in a stationary mold.

To obtain high yield, the heads usually placed on top of the rims of gear blanks, wheels, sprockets and similar castings in static pouring are omitted in molds to be poured by the semi-centrifugal method; in fact, open heads could not be used, as the steel would be thrown out of them in spinning the molds. A central head over the hub is, as a rule, relied upon to feed the spokes or plate of such a casting, and they in turn are expected to feed the rim.

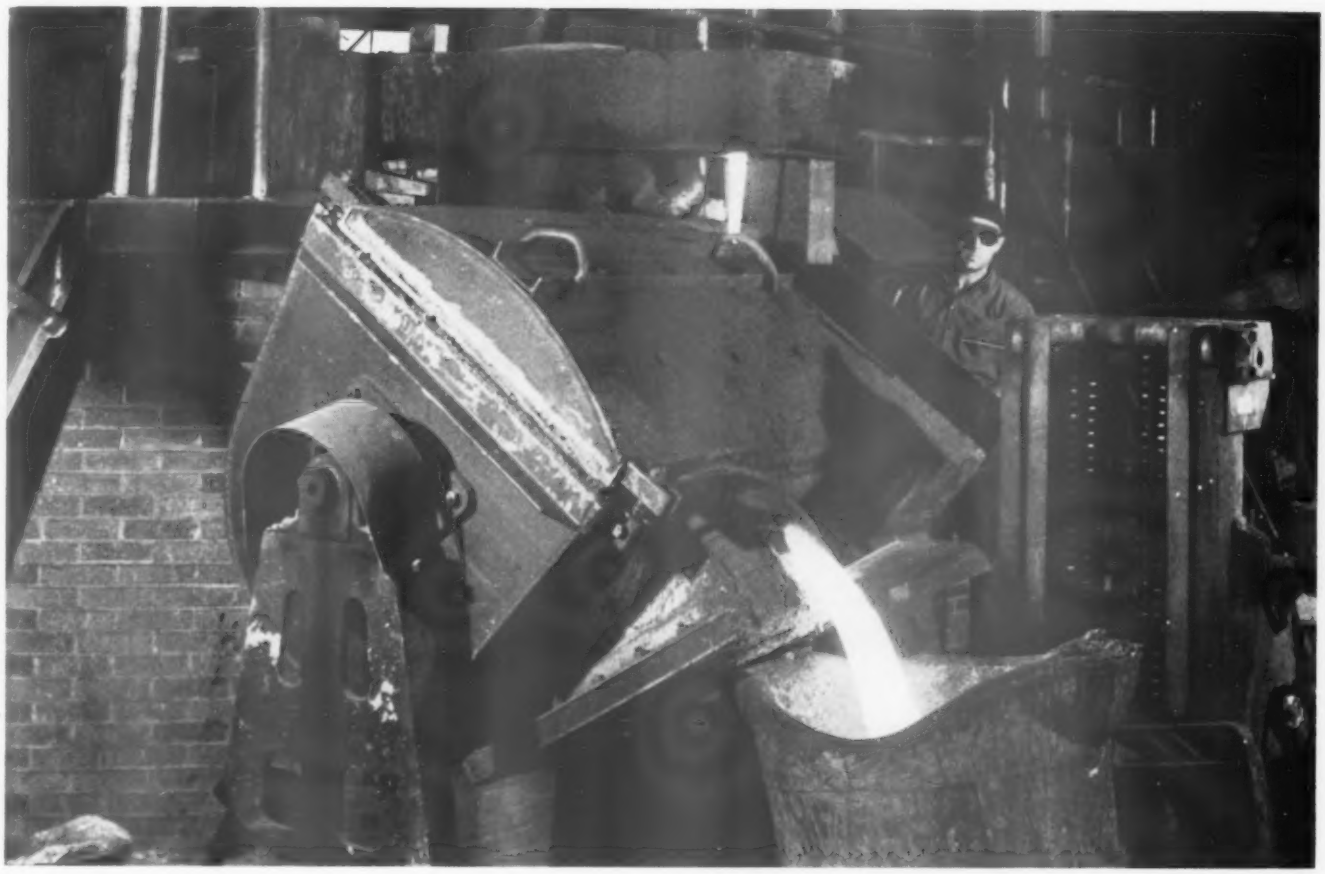
Molds Are Stacked

When the pieces to be made are small enough to be molded in round slab cores, a number of castings are sometimes made in a "stack' of such cores set one upon the other, and clamped down on the plate of the machine. The hubs of the wheels are then usually poured solid, and connected together to form a continuous passage from top to bottom of the stack, as shown in Fig. 8, from the paper by Donoho[2] already quoted. The advantage of this method is that more castings can be produced on each machine at one pour than when using single molds, rather than in any improvement of the individual pieces due to the greater gravity pressure in the lower tiers of the stack. It is also possible to form stacks of sand rammed up in light circular flasks, and such assemblies have the obvious advantage of being less liable to burst apart in pouring and spinning than stacked cores are. From this point of view, cement-bonded sand is very well suited to the production of cores for castings poured by this process, because of the high strength of the cement-sand mixtures after they are properly cured.

In addition to gear blanks and wheels, various annular shaped castings such as sprocket rims have been

(*Continued on page* 236)

"IRONTON NOJOINT" for Foundry Ladles



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mechanization in your foundry
really mean dollars and cents to you.

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(*Continued from page* 234)

produced by the semi-centrifugal process, using methods closely similar to those employed for gears and wheels. In this practice, the metal is poured into a central space shaped like the hub of a wheel and connected to the casting proper by gates that resemble spokes. As only the part corresponding to the rim of a gear blank is to be used, an effort is made to so proportion the central opening and the spoke-like gates that when the casting has solidified they will be drained of their metal, with only a shell remaining, resembling a spoke-type gear blank that has been "poured short."

In making castings of this general shape, the ends of the gates are sometimes enlarged considerably, forming reservoirs of metal which are relied upon to feed the contraction of the casting proper and prevent the formation of cavities. Instead of molding these castings in single molds, they may also be made in stacks of cores, but in that case it is not possible to have the central opening and the spokelike gates left hollow after the castings have solidified.

Carried to Bottom

A modification of this method is sometimes adopted, in which the metal is carried down a central gate to the bottom of the stack, and up through several riser gates connecting with sprues entering the casting at a number of points. Usually in this practice also the ends of the sprues are enlarged close to the casting, with the intention of providing reservoirs of fluid metal to feed the contraction of the casting proper. The weight of the several riser-gates in this method of molding reduces the yield compared to what can be obtained with single molds fed through gates that are allowed to run themselves hollow. Figs. 9 and 10 from an article by Blackwood and Perkins[8] illustrate this method of production as applied to the manufacture of tractor sprockets.

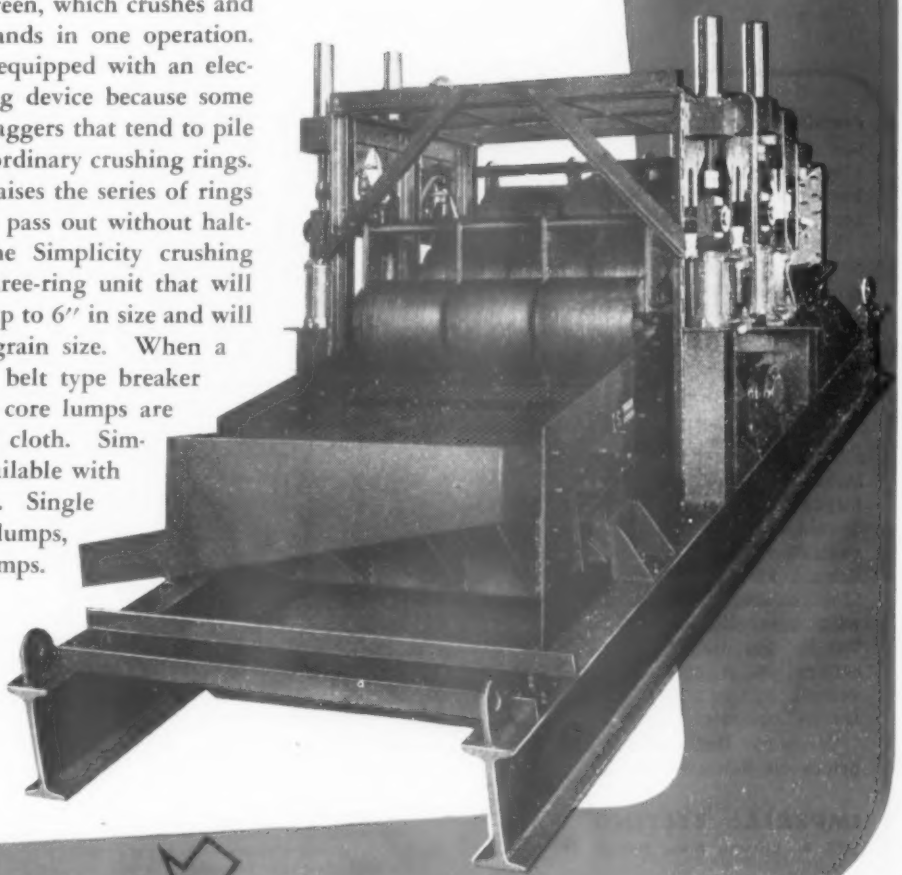
Many methods have been employed to introduce the metal into the hubs of wheels and gear blanks made singly in cope and drag molds. When the bore is large enough, it is possible to use the central core for the location of the gate, and feed the steel to the mold cavity through openings either part way down or at the bottom of the hub. Examples of two ways of doing this are shown in Figs. 13 and 14, taken from the article by Wright and Caine[6]. In their practice the molds are first

(*Concluded on page* 238)

Making Double Duty Pay

Simplicity Ring Type Crushing Screens Combine Two Operations Effectively

One of the most popular Simplicity foundry units is the Ring Type Crushing Screen, which crushes and screens moulding and core sands in one operation. This rugged machine can be equipped with an electrically timed automatic lifting device because some sands contain bent rods and gaggers that tend to pile up so they do not pass under ordinary crushing rings. The automatic lifting device raises the series of rings to permit the accumulation to pass out without halting machine operations. The Simplicity crushing screen illustrated here is a three-ring unit that will take a feed containing lumps up to 6″ in size and will reduce 75% of the load to grain size. When a lower deck with a Simplicity belt type breaker is added, 90% of the hardest core lumps are reduced to pass a 1/8″ screen cloth. Simplicity crushing screens are available with one, two or three sets of rings. Single rings take up to two-inch lumps, double ring up to four-inch lumps.



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(*Concluded from page* 236)

poured, then spun. Of the two methods illustrated the second seems preferable, as it includes the use of a heavy head upon the top of the hub, which provides a source of hot metal which will remain fluid longer than the annular head used in the first method, and therefore should more efficiently feed the contraction of the casting.

Figs. 16 and 17 from an article by Johnson[10] are open to the criticism that they do not provide an adequate reservoir of fluid metal to feed the contraction of the casting which therefore will not always be free from internal shrinkage cavities. Perhaps the simplest and most effective method is to pour through a head that covers the entire hub, as in Fig. 18 from Johnson's article, and either use a central core extending only part way up the hub, or omit this core altogether, so that the steel strikes the drag. The top of the core, or the surface of the drag at the point where the metal impinges, must be of very hard sand mixtures and well nailed, otherwise it would be likely to "wash" badly. Loose sand carried into the mold in this way would usually lodge against the cope or the outside of the piece, and in some cases would necessitate the rejection of the casting. To omit the central core entirely and pour the hub solid reduces the yield of metal secured, but it may in some cases be advisable to follow this practice, in order to be certain of obtaining a sound casting.

(*To be concluded next month*)

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2. C. K. Donoho—"Centrifugal Casting of Steel," *Transactions* AFA, Vol. 52 1944, p. 315.
3. S. D. Moxley—"Centrifugal Casting of Steel," American Society of Mechanical Engineers, April 1944.
4. H. R. Zuehlke—"Producing Nonferrous Castings Centrifugally", THE FOUNDRY, October 1942, p. 69.
5. F. G. Carrington—"Spinning Speeds of Centrifugal Casting Machines," *Transactions* AFA, Vol. 52, 1944, p. 333.
6. W. F. Wright and J. B. Caine—"Centrifuging After the Mold Is Filled with Steel," THE FOUNDRY, May 1943, p. 91. Note: The term "centrifuging" employed in this title is not used in the same sense as that employed by the present author.
7. C. K. Donoho—"Casts Steel Centrifugally," THE FOUNDRY, April 1943, p. 130.
8. E. C. Jeter—"Improvements in Pressure Ferrous Castings Influencing Their Future Use," *American Foundryman*, December 1944, p. 5.
9. Peter Blackwood and John Perkins—"Centrifugal Castings," *Transactions*, AFS, Vol. 52, 1944, p. 273.
10. Anton Johnson—"Steel Sheaves Are Cast Centrifugally," THE FOUNDRY, June 1943, p. 139.

Calumet Foundry & Machine Co., 148th St., & Railroad Ave., East Chicago, Ind., has gone out of business and is liquidating its machinery and equipment.

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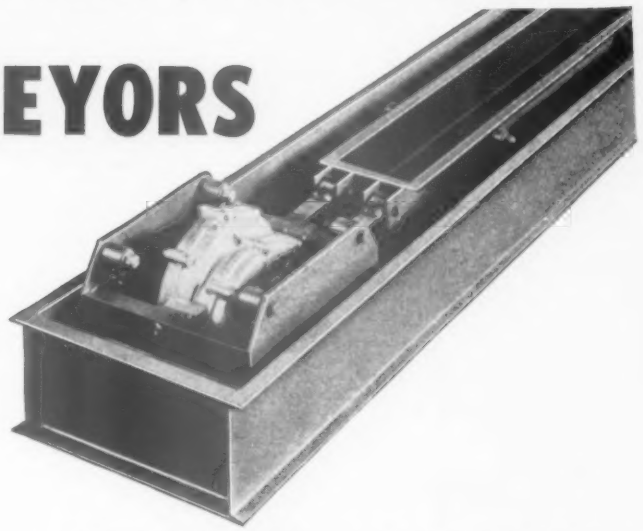
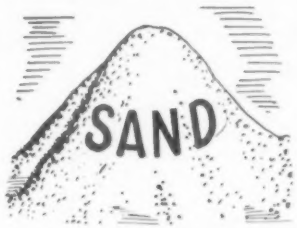
Questions and Answers about AJAX LO-VEYORS



WHAT MATERIALS CAN BE HANDLED?

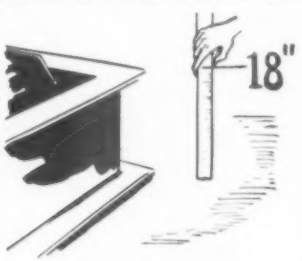


Dry aggregate materials ranging from granular up to 6" lumps such as sand and castings.

IS DUST-TIGHT OPERATION AVAILABLE?

Flat conveyor pans with cover and booted inlets and outlets and also gastight tubular conveyors permit handling materials without contamination or explosion

HOW MUCH HEAD ROOM IS REQUIRED?

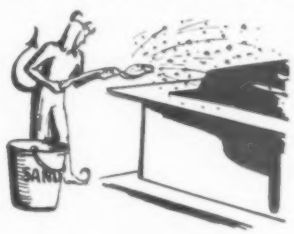


Average overall height is less than 18" except for a short distance where shaker is mounted.

HOW DO AJAX LO-VEYORS REDUCE COSTS?

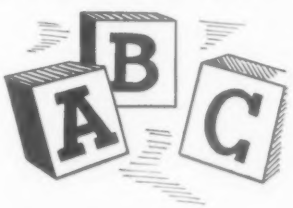
They eliminate moving materials by costly non-productive shovel and wheelbarrow methods.

ARE ABRASIVE CONDITIONS HARMFUL?



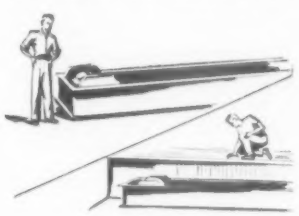
Unaffected by sand and abrasives, they are ideal for foundries, chemical plants, cement mills, etc.

HOW DOES AJAX REDUCE WEAR?



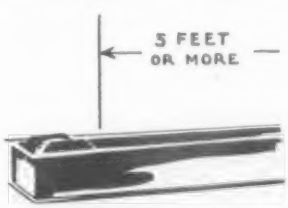
Reciprocating drive unit is completely enclosed. All eccentrics, idler pulleys and exposed bearings are eliminated.

CAN AJAX LO-VEYORS BE INSTALLED ANYWHERE?



They are self-contained units ready to set in place and use. Easily installed on or below floor or suspended from wall or ceiling.

CAN THEY BE USED FOR SHORT AND LONG CARRIES?



Lengths, widths and capacities to suit various materials, plant conditions and requirements of the process.

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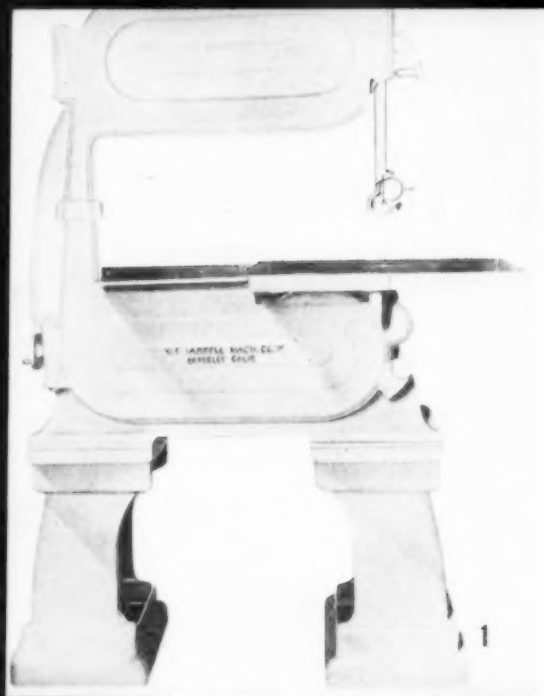
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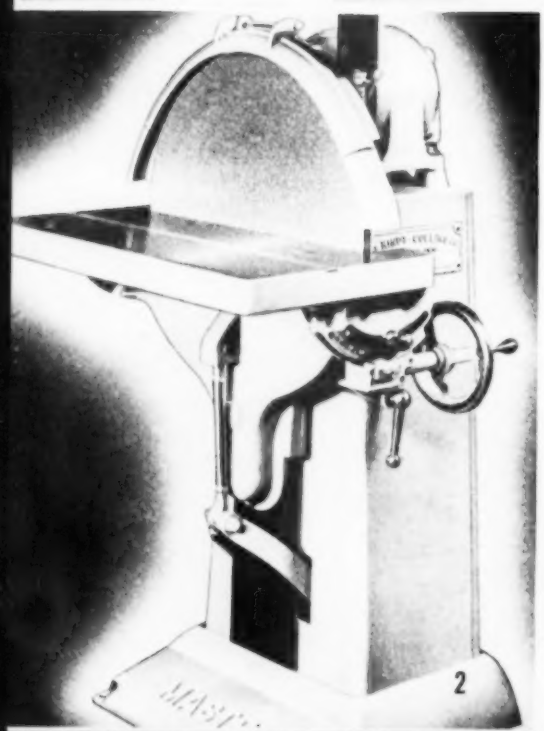
(1)—Bandsaw: T. Farrell Machine Co., 2835 San Pablo Ave., Berkeley 2, Calif.—Four-wheel bandsaw is designed for trimming flashing and for high speed cut-off of gates and sprues on nonferrous castings. Features of the saw are a capacity of 12½ x 27 in.; 18 x 24-in. table which tilts 45 degrees right or 10 degrees left; an auxiliary table 16 x 18 in. and blade speeds of 550, 1050, 1750 and 2700 fpm. A low speed model is available with gear drive offering a range of speeds starting at 65 fpm. Construction details include sealed factory-lubricated antifriction bearings, gray iron base and table castings, aluminum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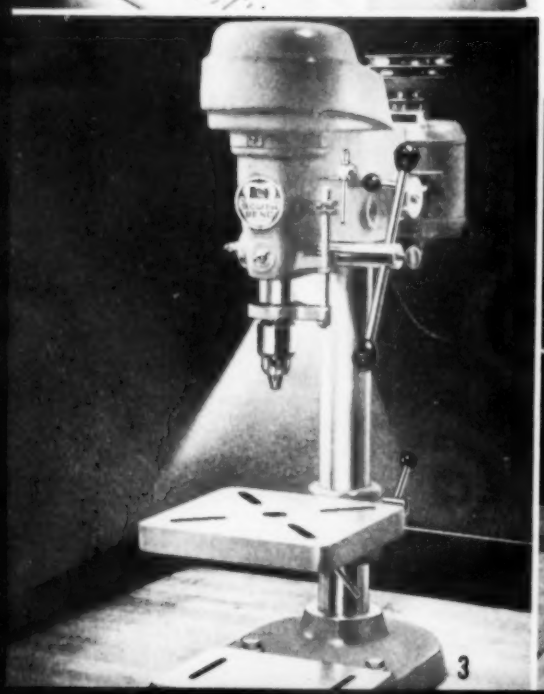
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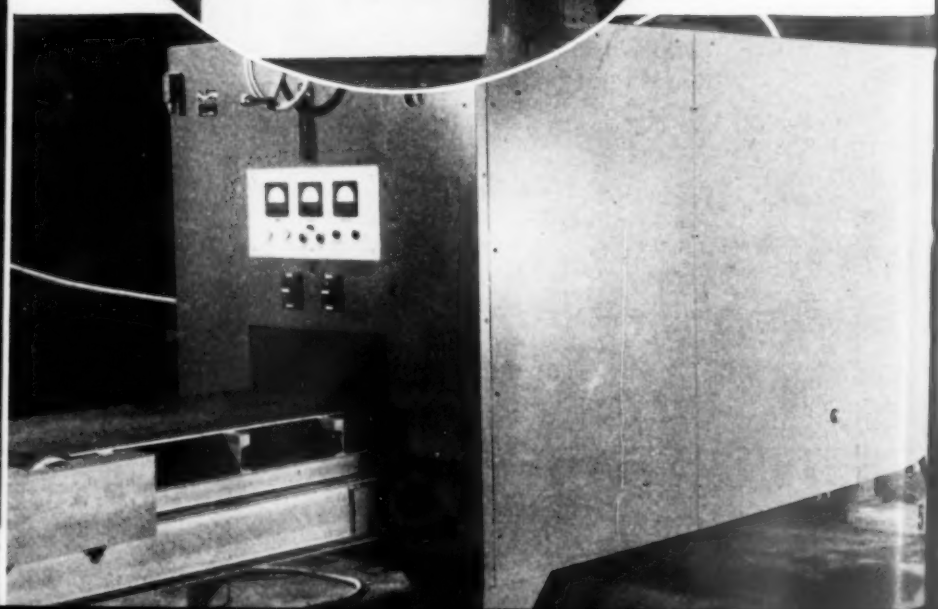
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guard castings and sealed ball bearing saw guides. The four wheels are 12 in. diam, and the machine uses blades 10 ft, 4 in. long and from ⅛ to 1 in. wide.

(2)—Disk Grinder: Kindt-Collins Co., 12653 Elmwood Ave., Cleveland 11—Disk grinder is designed for sanding or grinding wood, metal and plastics. The 24-in. disk operates at 1150 rpm and is reversible for right or left hand jobs. Grinder is said to be vibrationless through good balancing which permits extreme accuracy in grinding. Counterbalanced table, 13 x 30 in., may be set at any height between 26 and 37 in. of the floor, tilted up to 30° or down to 45° and locked in any desired position. A 5-in. hole in the back of the machine permits attaching to a house suction system or dust collector.

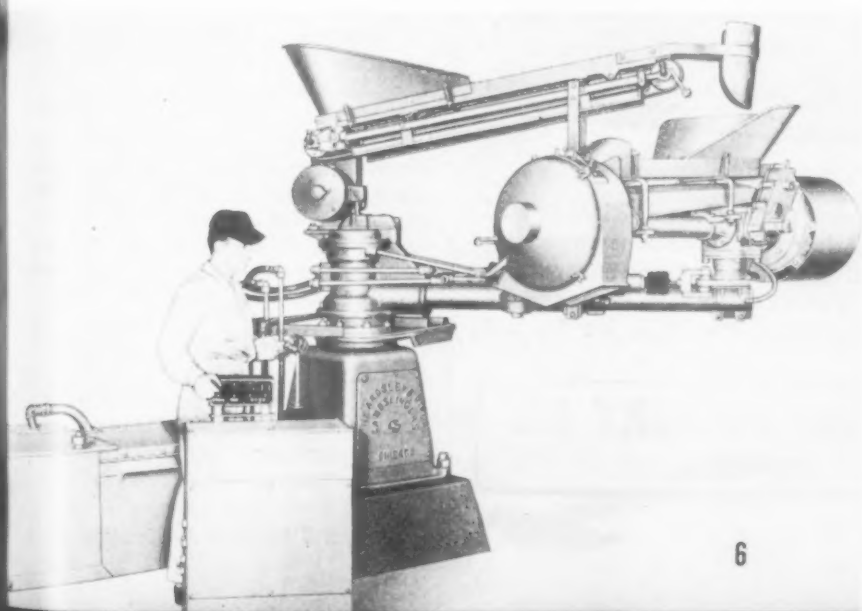
(3)—Drill Press: South Bend Lathe Works, 299 East Madison St., South Bend 22, Ind.—Newly designed drill press has capacity to drill ½ in. holes in iron or steel at the center of a 14-in. circle. Drill press has built-in light providing shielded illumination for the work area. Quick-acting belt tension release lever simplifies changing spindle speeds and returns the vertical mounted motor to its original position after each change, thus maintaining the same belt tension for each of the four cone pulley steps. Spindle has maximum travel of 4 in., speeds of 707, 1305, 2345 and 4322 rpm., and free floating design said to prevent misalignment, side thrust and whip. Depth gage is graduated in sixteenths of an inch, and has adjustable collars to control depth of feed and length of return stroke. Precision ground, 10 x 10 in. tilting table has slots for clamping fixtures or work. Drill press is supplied with or without ⅓ hp, 1725 rpm motor. Bench drill press has 10⅞-in. chuck to table distance, 17-in. chuck to base distance, 10¾ x 17¾ in. slotted precision ground base and 35½ in. overall height. Floor model drill press has 40⅛ in. chuck to table distance, 46½-in. chuck to base distance, 15 x 21-in. slotted, precision ground base and 65½-in. overall height.

(4)—Core Oven: Despatch Oven Co., 619 S. E. Eighth St., Minneapolis—Economy oven for production core baking in small foundries and for auxiliary equipment in large operations is designed for small cores in quick bakes of an hour or less. It also accommodates large cores, rush jobs, drying and pasting work. Oven is gas-fired and has forced convection and exhaust and automatic safety and temperature controls which permit preset temperatures up to 450° F. Junior model provides for two to six shelves in two 24 x 30 x 36-in. openings. Oven occupies 16 sq ft of floor space and is 7½ ft high, 49 in. wide and 43 in. deep. Senior model consists of two complete junior models engineered into one cabinet with partition. Installation requires only the attachment of a gas line and plugging into 110 v outlet.

(5)—Electronic Core Baking: Induction Heating Corp., 181 Wythe Ave., Brooklyn 11, N. Y.—Electronic core baking tunnel is said to have an average baking cycle of only a few minutes and a capacity of 650 lb of cores per hour. The rapid baking cycle is said to prevent core sagging during the baking operation and to eliminate much handling of green cores because they can be loaded directly on the tunnel conveyor. After the baking cycle there is no cooling period involved, it is claimed. Cores are ready for immediate inspection and use. The tunnel uses power only when it is actually heating cores. Because the electronic process generates all the heat within the cores, no heat is given off to the surrounding atmosphere. The tunnel is a continuous conveyor type, self-contained, and measuring 16 ft, 9 in. long; 4 ft, 4 in. wide and 6 ft, 8 in. high

(6)—Sandslinger: Beardsley & Piper, Division of Pettibone Mulliken Corp., 2424 North Cicero Ave., Chicago 39—Newly developed stationary type sandslinger with hydraulic power controlling and directing the movement of the ramming arms is designed to provide maximum production in molding units where flasks and patterns move into the ramming area. From the control station the operator easily directs movement of the ramming head over the mold with accuracy and speed. The control station may be at floor level or elevated to provide the best visibility for the particular installation. Standard model has a range in overall arm lengths of 10 to 15 ft, ramming capacity of 7 to 10 cu ft, head sizes of 16 and 19 in. and tip size of 4 in. Super model has a range in overall arm lengths of 10 to 15 ft, ramming capacity of 10 to 15 cu ft, head sizes of 19 and 22 in. and tip size of 5 in.

(7)—Core Paster: Valley Mfg. Co., Cherry Valley, Ill.—Core paster is designed for pasting of large and small cores for all types of castings and is said to provide an even thickness of paste on the entire surface of vented half of core. Two or three persons can work on one machine and both small and large cores can



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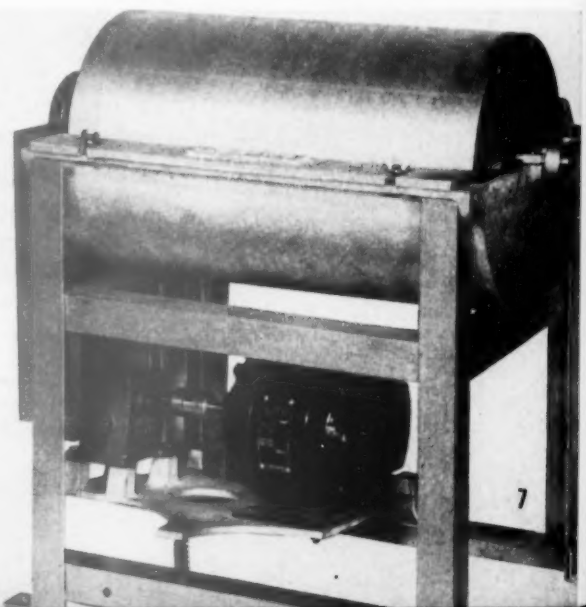
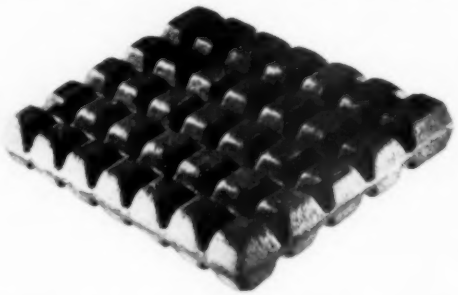


7

Improve Cast Iron Quality with

GCC BRAND CERIUM METAL (MISCHMETAL)



Only small additions of Cerium Metal (Mischmetal) will help you make better iron castings which result in finer quality finished products. Specify GCC Brand in which the Cerium content is over 50%. The amount of iron has been reduced almost to the vanishing point; and the alloy is practically free of impurities and enclosures.

Send for our Metallurgical Bulletin No. 101 and our special reprint of article entitled "Nodular Graphite Structure Produced in Gray Cast Iron" by H. Morrogh.

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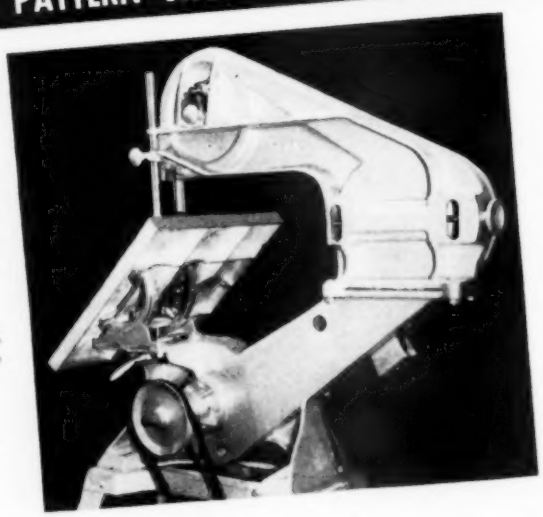
FOR FOUNDRY AND PATTERN SHOP PRECISION WORK

The OWEN
DEEP THROAT
BAND SAW

18¼" BLADE TO FRAME
30° INSIDE 45°
OUTSIDE TABLE TILT.
CUTS WOOD TO 8"
NON-FERROUS
METALS TO 2½"
THICKNESS.
ALSO PLASTIC.



The Owen Saw is the only saw that offers 30° inside and 45° outside table tilt permitting work without reversing layout. Positive table lock at any angle prevents creeping with heavy overhang jobs. Wheels placed 1" from torque line of frame eliminates vibration. Operates on ½ HP motor.

THE OWEN PATTERN AND FOUNDRY CO.
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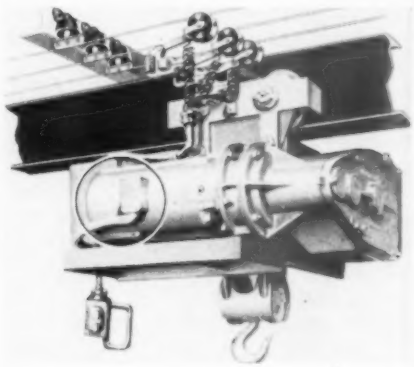
be pasted at the same time. This is made possible by adjusting ends of the spacer plate the proper distance from the drum, producing the desired thickness of paste at one end of drum for large cores and a suitable thickness of paste at the other end of the drum for small cores. Drum is machined accurately, permitting fine adjustment of paste thickness. Drum and other parts which come in contact with the paste are made of aluminum. Machine is powered by a ¼ hp motor and power is transmitted by V-belt through a speed reducer outlet to the drum.

Hoist Brake: Robbins & Myers Inc., 1345 Lagonda Ave., Springfield, O.—Automatic self-equalized motor brake for the company's electric hoists is magnetically released and



consists of a series of self-aligning circular friction disks, alternated with brake plates attached to the motor shaft. The mechanism is operated automatically by dual voltage brake coils that correspond to those of the hoist motor—only a shift of motor connections is required should power source voltage change. If power is switched off or fails, the brake is designed to hold the load securely. Brake adjustment is accomplished by a single external screw.

Treading Tool: Metallizing Engineering Co., Inc., 38-14 30th St., Long Island City 1, N. Y.—Tool is designed to provide a simple, low cost method of applying tread to smooth steel or iron surfaces to help prevent slipping and falling accidents. It is a vibrating electrode holder used with either ac or dc welding machines to deposit hard, rough bead lines about 1/8 in wide and 1/16 in. high. In operation, the end of the electrode is placed in contact with the surface to be roughened and drawn along at approximately 5 fpm. It is not necessary to hold an arc, since the vibrator causes intermittent

(*Continued on page* 244)

How efficiently are you Burning Fuel?

YOU CAN FIND OUT – IN JUST A FEW MINUTES – WITH THE CITIES SERVICE

INDUSTRIAL HEAT PROVER

THE CITIES SERVICE Industrial Heat Prover will take a sample of gas direct from the combustion chamber of your furnace or oven and register immediately the exact percentage of oxygen or unconsumed fuel.

This unique instrument will effect savings by improving combustion efficiency. It will

- **Help increase production.**
- **Save fuel—which is particularly important during the present critical shortage.**
- **Lengthen the life of your furnaces, crucibles and refractories.**
- **Insure product uniformity.**

FOR FREE DEMONSTRATION CONTACT YOUR NEAREST CITIES SERVICE OFFICE OR MAIL IN COUPON BELOW

CITIES SERVICE OIL CO.
919 N. Michigan Ave.
Chicago 11, Ill.

Without obligation please have Cities Service engineer demonstrate the Industrial Heat Prover

Name _____

Concern _____

Address _____

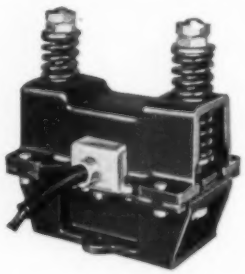
City & State _____

CITIES SERVICE OIL COMPANY
CHICAGO, CLEVELAND, KANSAS CITY, ST. PAUL
ARKANSAS FUEL OIL COMPANY
SHREVEPORT

SYNTRON

"Pulsating Magnet"

ELECTRIC VIBRATORS



Keep Bins, Hoppers and Chutes Open and Free-Flowing

What They Are

Pulsating electromagnets that produce 3,600 vibrations per minute from 110, 220 or 440 volt, 60 cycle A.C. There are no cams, gears, or eccentrics—merely electromagnetic reciprocation from half-wave rectified current.

Where Can They Be Applied

To any size and shape of bin, hopper and chute—whether made of steel, wood or concrete.

How They Are Applied

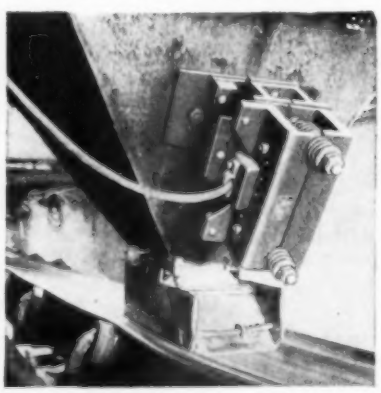
Thickness or gauge of wall is the most important factor. However, overall dimensions, cubic content, degree of fineness and moisture content of material must also be considered.

Write,

Giving the details of your troublesome bin or hopper—our Engineering Department will be glad to give you their recommendations.

SYNTRON CO.

540 Lexington, Homer City, Pa.



(*Continued from page* 242)

arcing, which melts the end of the hard steel electrode and fuses the molten droplets to the base. Deposited metal is said to retain its slip-proof qualities, even when wet or oily.

Air Filter: Lintern Corp., 64 Lincoln Ave., Berea, O.—Air filter is designed for crane cabs where mechanical refrigeration is not required and atmospheric conditions are bad. Unit is equipped with a mechanical screen filter on the fresh air intake. Air passes through an electro-static filter of 350 cfm capacity which clears the air of smoke and vapors; then the air filters through a bank of 12 activated car-

bon cannisters which remove waste gases and fumes. Unit is equipped with an automatic thermostatically controlled electric heater and features rapid circulation of air in the cab. Unit measures 14 x 26 x 60 in., is available for alternating or direct current operation and is designed for easy accessibility to filters for servicing. Other models of crane cab air filters are available with refrigerating units.

Salt Bath Furnace: Ajax Electric Co. Inc., Frankford Ave. at Delaware Ave., Philadelphia 23—Deep salt bath furnace, design for heat treating in the temperature range of 300 to 2400° F, permits the work, regardless of its length, to be hung vertically. In these deep furnaces, several pairs of electrodes are inserted through the side walls and are cascaded, one above the other. In the event that the salt should freeze, no damage is done. In restarting, the top pair of electrode melts the salt within its zone and presents molten

(*Continued on page* 246)

"RAPID" MOLDING MACHINES

★

PORTABLE JOLT SQUEEZER R9X

WRITE for NEW BULLETIN "F"

PORTABLE HAND SQUEEZER R-10

PIONEER MANUFACTURING CO.

Molding Machine Manufacturer for Over 20 years

MILWAUKEE (West Allis) WISC.

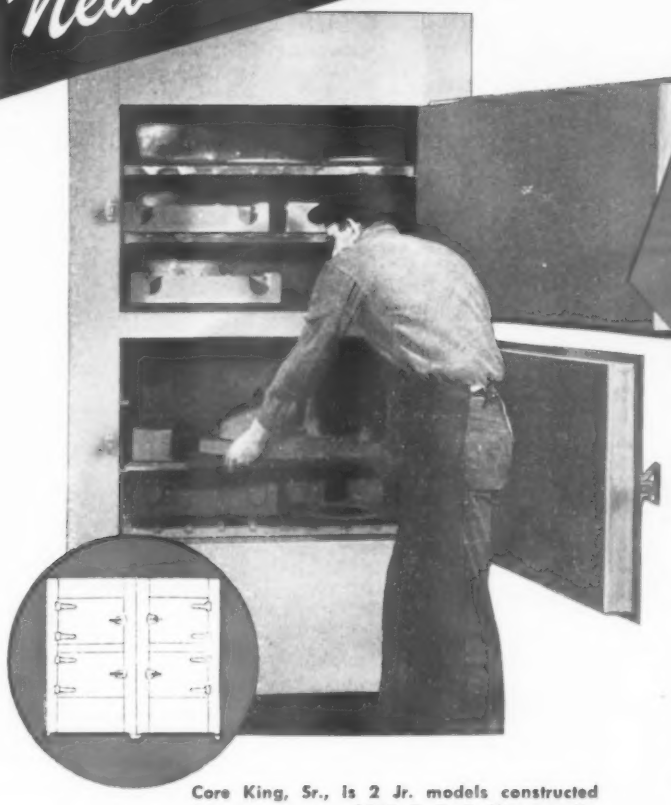
Forced Convection
UTILITY OVEN
at a
New **LOW COST**

New . . . Economical

DESPATCH **CORE King**

ALL-PURPOSE FOUNDRY OVENS

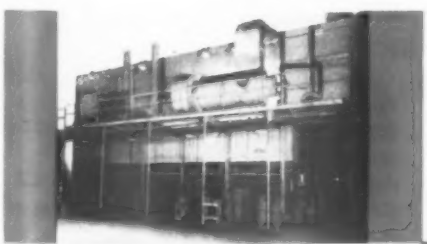
COMPLETE
DESPATCH
FOUNDRY OVEN LINE!



Core King, Sr., is 2 Jr. models constructed into one oven . . . $995. F. O. B. Minneapolis.

Now, DESPATCH can provide the smallest as well as the largest core baking facilities.

$625.00 F.O.B., Mpls., buys this outstanding forced convection shelf-type oven for small foundry production and auxiliary use in large operations. Automatic temperature and safety control plus the extreme portability of the unit make it ideal . . . very handy for rush jobs and experimentals. Core King ovens are shipped completely assembled. Jr. Model occupies 16 sq. ft. of floor space. Height 7½′; width 49″; depth 43″. Shipping wt. 1,000 lbs. Has room for 2 to 6 shelves at $7.50 ea. extra. Shelf space 36″ x 30″.



No matter what your core baking, mold drying, blacking or pasting problem, DESPATCH engineers can solve it.

Continuous conveyor ovens, gas, oil or combination fired, horizontal, tower and other types.

Batch-type ovens, all types of loading. Lift or swing doors.

Finish baking ovens also used in some foundries for blacking and pasting, gas, oil, electric or steam heaters.

See 8-page bulletin in Sweet's 1949 Mechanical Industries File and write today for descriptive Core King bulletin.

Core Ovens
Finishing Systems
Heat Treating Furnaces
Heaters and Dryers
Laboratory Ovens (all types)

DESPATCH
OVEN COMPANY

Minneapolis Office:
619 8th St., S. E.

Chicago Office:
221 N. LaSalle St.

ARE YOU USING TAMMS PRODUCTS?

TAMASTONE

Foundries everywhere report 400% to 600% increase in production when they use TAMASTONE, the perfect pattern compound. With TAMASTONE there is no need to send match plate work "out". Make your own, in your own foundry. Save time. Eliminate delays! TAMASTONE mixes with water only. Is poured in a sand mold by your own molder. No special accelerators, retarders, special vehicles or special experience needed. Patterns are ready to put in production the following day. A 12"x16" match plate averages about $12 for material, molding and cleaning time. Why not try TAMASTONE and see for yourself?

METALINE

Forms metallic coating over wax fillets or modeling wax buildups. Prevents warm sand from sticking to waxed sections of pattern.

PATTERNSEAL

Seals wood, metal and Super Tamastone Patterns. Eliminates application of parting. Gives cleaner detail—smoother castings. Speeds production.

Liquid PARTING

Keeps sand from sticking to patterns. Does not build-up or interfere with detail. Spray on, dry with air hose. Match plates run a full day with 2 applications.

TAMOLENE WAX

A special liquid wax for coating demountable frames. Makes it easy to remove Tamastone plates from frames. Also recommended as separating liquid for male and female patterns and dies.

PLASTIC METAL

A high quality plastic metal filler that is ideal for filling and smoothing rough metal surfaces of castings or metal match plates. Comes in handy ½ pint cans.

MODELING CLAY

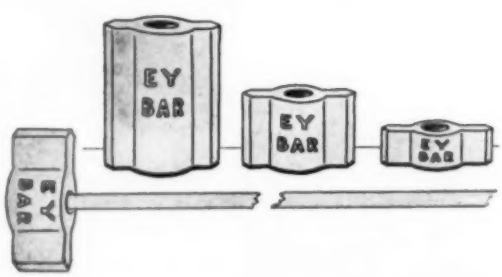
An easy working plastic clay that holds detail. Can also be used for changing gates, if shellac or metaline is applied. Designed for foundry or pattern shop.

Also makers of No. 90 Iron Oxide, Tamms Demountable Frames, Pyramid Skimmers, etc. . . . order today!

TAMMS SILICA CO., 228 N. La Salle St., Chicago 1, Ill.

ALUMINUM

TRADE **EY-BARS** MARK



Made Only by

THE CLEVELAND ELECTRO METALS CO.

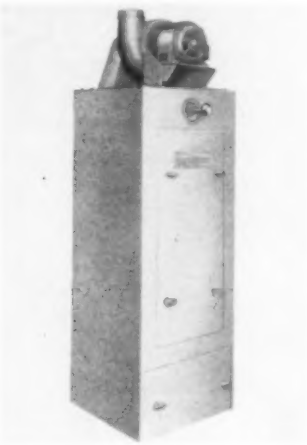
CLEVELAND, OHIO

MEMBER—ALUMINUM RESEARCH INSTITUTE

(*Continued from page* 244)

salt to the electrodes directly beneath and so on down to the bottom of the bath. Heating current is confined to the narrow gap (about 1 in.) between the electrodes. Thus, it is claimed, the full depth of the furnace may be used without danger of current entering the work to cause overheated zones or premature pot failure due to hot spots.

Dust Collectors: Parsons Engineering Corp., 2545 East 79th St., Cleveland—Small, portable, self-contained dust collectors have air handling capacities of 550 to 1350 cfm. Available in four models, these dust



collectors are designed to be set close to the source of dust by attaching pipe or flexible tube to collector inlet and are said to be applicable for filtering and collecting practically all types of industrial dust. Filtered air is returned to the room, thus preventing heat loss during operation in cold weather.

Spectrographic Analysis: Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.—New accessories developed by the company for use in spectrographic analysis include a densitometer, a spectrum plate projector, a safety arc and spark stand, an electrode shaper and a briquetting press. Densitometer permits direct reading and/or continuous recording of the density of the lines in an analytical spectrum, for determining, quantitatively, any element present in the specimen. The spectrum plate projector aids indentification of unknown elements in any specific material or specimen. The safety arc and spark stand is designed to insure protection in using the high voltages needed to burn the specimen in the arc for spectrographic analysis. The electrode shaper has a rotatable tur-

(*Continued on page* 248)

EVER MEET AN AD... talking?

MOST ads have work to do—selling goods or services.

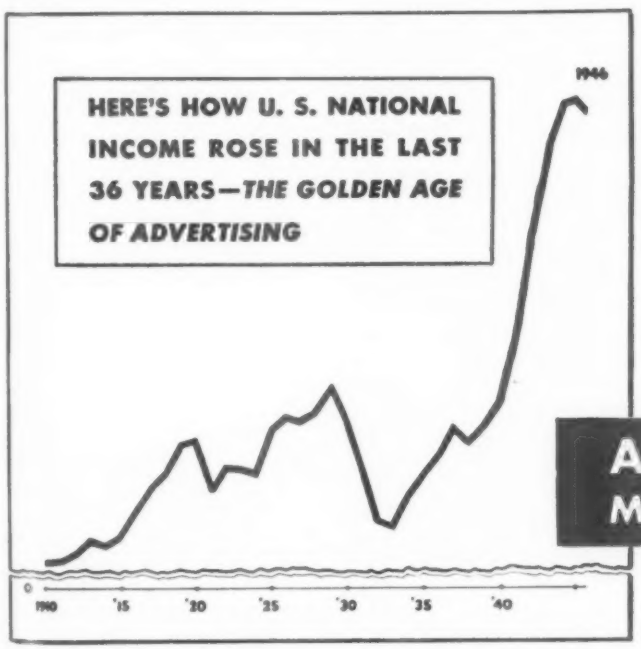
I am an ad. But I'd just like to talk with you and tell you how important advertising is to America—and to *you*.

No matter what kind of job you have, your pay check depends in the last analysis on somebody selling something to somebody else. And advertising is the fastest, cheapest way ever devised of selling goods and services.

So every ad you see or hear starts an endless chain that leads to more and better jobs for all.

When more goods are sold, there are more jobs in the factory—more jobs in the mines and farms to supply the goods the factory uses. More jobs at banks, railroads, stores and other industries that benefit indirectly.

That's why more and better advertising means bigger and better jobs—for you and everyone. That's why advertising makes *your* job more secure.



This rise in the standard of living for you and yours is unequalled in all history. Advertising helped raise this standard, is needed even more today to sell industry's new developments.

OTHER WAYS ADVERTISING HELPS YOU AND YOUR FAMILY

1. **Brings you better goods for less money.**
2. **Makes shopping more pleasant and easier.**
3. **Gears consumer demand to production, to create prosperity.**

Advertising... BY SELLING MORE GOODS TO MORE PEOPLE
Makes your job more secure

Advertising Federation of America

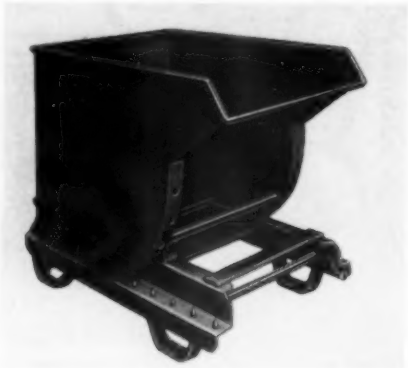
(*Continued from page* 246)

ret equipped with adjustable cutters, drills and tools for shaping graphite rods into the various standard electrodes used as arc and spark excitation sources. The briquetting press compresses powdered drugs, chemicals, plant ashes, drill chips, hacksaw dust, etc., into small pellets.

Grinders: Buckeye Tools Corp., 29 West Apple St., Dayton 1, O.—Group of pneumatic tools are designed to feature lightness, compact size,

good balance, quiet operation, improved governor control, increased power, simplified maintenance, direct air flow and ease of lubrication. Included in the group are horizontal grinders with speeds from 3000 to 22,000 rpm, weights of 1 to 12 lb and capacities from ½ to 8-in. diam. Vertical grinders and sanders have speeds from 3000 to 6000 rpm, weigh from 10 to 12 lb, have grinding wheel capacities from 4 to 6-in. diam and sanding pad capacities from 5 to 9-in. diam.

Skid Dump: Phillips Mine & Mill Supply Co., 2227 Jane St., Pittsburgh 3—Dumping unit is designed for use with platform or fork lift



trucks and has a capacity of 0.9 cu yd and with a 6-in. surcharge capacity may be increased to 1.11 cu yd. Unit is constructed of 3/16-in. steel plate with smooth rolled edges and has formed channel legs and welded undercarriage. It hauls and dumps heavy loads of scrap, castings and other industrial materials. Another model of the dump unit equipped with wheels and of ½ cu yd capacity also is available.

Combination Power Truck: Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland — Industrial power truck combines a low-lift platform and a crane which can lift a load from floor level to a hook height of 8 ft, within a radius of 45 degrees left or right from base. Truck body remains stationary while the operator moves the boom left or right by manipulating a lever. Cables which provide further control and which raise or lower the boom and its load are operated by a push-button pendant station near the hook. Boom may be locked in any overside or central position to avoid swing of load when truck is working on uneven floors. Crane capacity is 1000 to 2000 lb, depending on model. Crane and platform are operated independently of each other. The platform can lift and

transport loads weighing up to 3 to 5 tons, depending on size and model. Loads may be piled directly on truck's platform or on skids under which the platform can maneuver.

Electric Heaters: Edwin L. Weigand Co., 7500 Thomas Blvd., Pittsburgh 8 — Glassless, glareless electric radiant heaters are designed for drying, baking, preheating and dehydrating where a longer wave infrared heat source is desired and where all-metal construction is preferable. Heater has a high temperature enclosed heating element mounted in an extruded aluminum body with a reflector sheet of polished aluminum, which can be cleaned or replaced easily if necessary. Tongued and grooved sides and two sliding captive bolts facilitate fabrication of heater sections into various working patterns such as arcs, circles, squares, or others. Heating elements

(*Continued on page* 250)

"for Better Melting"

This is not just a tricky catch phrase. It's what you get when you use Semet-Solvay Foundry Coke in your cupolas. What is "better melting"? It's melting your iron *hotter, faster, cleaner.*

SEMET-SOLVAY DIVISION
Allied Chemical & Dye Corporation
CINCINNATI · DETROIT · BUFFALO
In Canada: SEMET-SOLVAY COMPANY, LTD., TORONTO

SEMET-SOLVAY FOUNDRY COKE

for Better Melting

FREMONT

MAGNESIUM FLASKS

ACCURATE-LIGHT-STURDY

FREMONT
CAST IRON JACKETS

All Orders Given Very Prompt Attention

BUILT FOR LONG SERVICE AND FAST PRODUCTION

GROOVLOCK
THE FOOL-PROOF PIN

THE FREMONT FLASK CO.
Fremont, Ohio

Here's how one plant saved production hours and dollars—simply by reviewing their materials handling operations.

It took two men to carry pots of molten metal from furnace to pouring room. Then it took a third man to pour the metal. A *Reading Engineer* analyzed the operation and recommended a ½-ton Electric Hoist on a monorail running *directly* from furnace to pouring floor. Now the job is handled by one man—in less time—and at far less cost!

To start reducing your own costs, let a *Reading Engineer* review your handling operations. At no obligation he'll give you suggestions that can lead to better, faster materials handling. Call or write for full details, now.

READING CHAIN & BLOCK CORPORATION
2108 ADAMS ST., READING, PA.

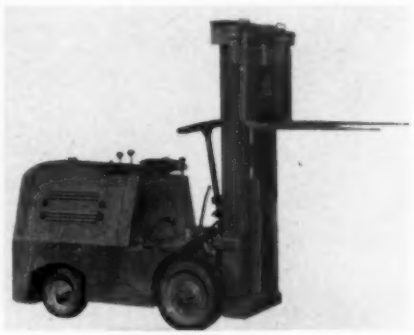
CHAIN HOISTS • ELECTRIC HOISTS
OVERHEAD TRAVELING CRANES

READING HOISTS

(*Continued from page* 248)

which operate at temperatures of 1000 to 1400° F, are mounted at the focus of a parabolic reflective surface, which results in maximum heat radiation uniformly distributed over the surface to be heated. Heaters are designed so that heating elements of same or different wattage can be changed on the job in minimum time. Three standard body lengths are 25, 31 and 47 in., with respective heater element lengths of 17, 23 and 39 in. Standard height of the heater is 4 in.

Lift Truck: W. F. Hebard & Co., 336 West 37th St., Chicago 9—Fork lift truck has capacity of 5000 lb rated at 20 in. from the heel of the forks, free lift of 55 in., telescoping lift of 110 in. and overall height of 83 in. with forks down. Other dimensions include overall width of

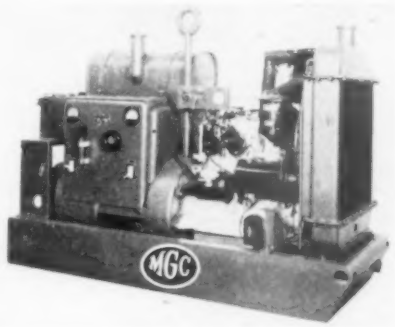


40 in., overall length less forks of 85 in. and outside turning radius of 88 in. Truck is powered by a 30.5 bhp gasoline engine, will travel at speeds up to 11 mph and has a loaded lift speed of 30 fpm.

Conveyor Belt: Hewitt Rubber Division, Hewitt-Robins Inc., 240 Kensington Ave., Buffalo 5—Hot materials conveyor belt, cushioned with rubber and strengthened with Fiberglas fabric, is said not to char or lose strength from heat under 350° F, nor lose strength at the fasteners by heat burning out around bolts. It is claimed that the belt will not stretch because of the minimum elongation in the fabric whose plies are described as strong as steel of equal weight.

Burn Ointment: Pharmaceutical Preparations Inc., 11 Niagara Street Bldg., Buffalo 2—Burn ointment is applied directly to the injured area and massaged lightly to insure proper penetration. It is claimed that pain is relieved in a few seconds after which the surplus ointment is wiped off and the treatment is complete. No bandaging is required. Healing is said to be rapid, and all types of burns respond equally well, including those caused by hydrofluoric and chromic acids.

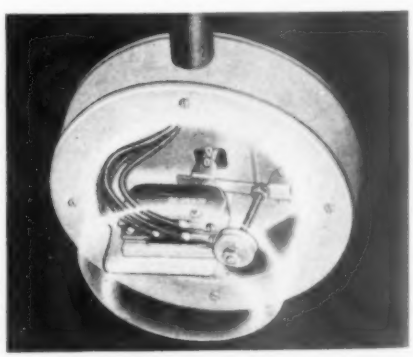
Generators: Motor Generator Corp., Hobart Square, Troy, O.—Gasoline engine driven generators for supplying power to magnet



cranes are available in six sizes from 5 to 25 kw. A commercial automotive type gasoline engine is standard, but Diesel engines may be furnished. They are connected directly to a common structural steel base, and are drip proof, ball bearing mounted, self ventilated and rated for continuous duty. All models are furnished with 6 v battery ignition, push button starter, radiator, and fuel tank.

Hoist Limit Stop: Reading Chain & Block Corp., 2108 Adams St., Reading, Pa.—New limit stop is designed to provide accurate and positive control of electric hoists. Limit mechanism is enclosed within the hoisting unit, eliminates operation rods and simplifies adjustments and the setting of limit stops.

Level Indicators: Bin-Dicator Co., Dept. P-1427, 14615 East Jefferson Ave., Detroit 15—Indicators

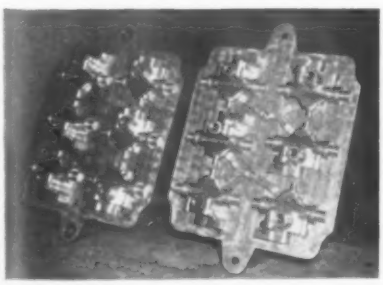


are diaphragm operated switches in sealed housings which mount on the outside of bins, hoppers, screw conveyors, etc., and signal changes in material levels. They are designed to start and stop automatically fill-

(*Continued on page* 252)

Part of our Milling Machine Section where numerous units of equipment and skilled workmen handle a wide range of work.

A view of our Duplicating Equipment used in the production of high precision patterns.



Typical all-machined pattern. This one consists of six brass patterns mounted on cope and drag steel plates.

Here is Where You Start to Save $ $ on Patterns

Right here in our Chicago plant where we are completely-equipped for the fast production of *all-machined patterns* . . . . patterns which cost far less for maintenance, patterns which speed up mold production (as cores drop into place "right"), patterns which produce castings that "fit the jig" (in the machine shop) with unerring accuracy. We say—*the patternshop is the foundry's "toolroom."* Here is where you start to make money! We invite your inquiry.

New BULLETIN on Core Blowing

We invite you to send for a copy of our new 8-page BULLETIN F

"CORE BOX DESIGNING AND RIGGING FOR CORE BLOWING"

Harry J. Jacobson and Ed. W. Swiess.

INDUSTRIAL PATTERN WORKS

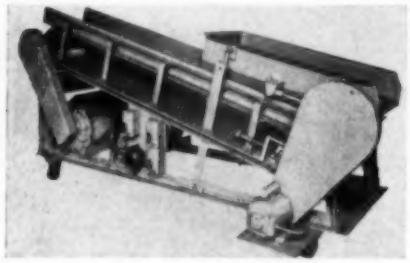
PATTERNS FOR PRODUCTION—PATTERN ENGINEERING SERVICE

2600 BELMONT AVE., PHONE: IRVing—0413 CHICAGO 18, ILL.

(*Continued from page 250*)

ing and emptying equipment as the level of material reaches designated limits and may be used on bulk materials weighing 2 to 350 lb per cu ft. They may be used to stop machinery when feed chutes or elevator boots become clogged with material.

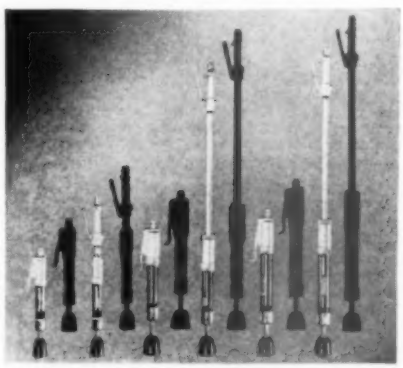
Magnetic Separator: Magnetic Engineering & Mfg. Co., Van Houten Ave. & Erie Railroad, Clifton, N. J.—Magnetic pulley type separator equipped with a reciprocating mechanical combination feeder and screen is designed for handling miscellaneous scrap metals and reclaiming molding and core sand. Material is fed onto the shaking screen; the larger particles pass off of the end of the screen, and the finer material drops through the screen to the conveyor belt where it is carried up over the magnetic head pulley. Machine illustrated is portable and is complete with unit motor drive and motor generator set. Machine may be equipped with a permanent or electro magnet pulley and furnished with belts from 12 to 60-in. wide. Length of machine can be modified to suit conditions.



Heat Fatigue Drops: Benson Laboratories Inc., Bessemer Bldg., Pittsburgh — Heat fatigue drops contain sodium chloride and two other body salts in approximately the same proportion as they are lost in perspiration in addition to dextrose which provides energy. Drops are made in butterscotch candy form, pleasing to the taste. Their purpose is to maintain a proper salt balance in the body and prevent serious heat cramps.

Fire Extinguisher: All - Out Mfg. Corp., 2 Park Ave., New York 16—Dry chemical fire extinguisher is designed to combine efficiency under most conditions with maximum protection to the user and to equipment installations. It is said to perform effectively under all climatic conditions and in the presence of winds and drafts. The dry chemical is ejected under pressure in a flat stream that separates the flame from the burning material, forming a dense, fire-smothering cloud over a flaming area up to a distance of 18 ft. The chemical is said not to deteriorate or form toxic gases. It is a nonconductor of electricity, nonabrasive, harmless to finished surfaces and is easily removed with a brush.

Sand Rammers: Rotor Tool Co., 17325 Euclid Ave., Cleveland—New line of bench and floor type sand rammers for all types of sand



ramming in gray iron, steel, malleable, aluminum and magnesium foundries are designed for lightness with fast ramming action. The tools feature hard chrome plated hollow piston rods, washer type valve of simple design, outside adjustment on packing gland and packing that requires no wrenches, air screen and automatic lubrication. Various models come in weights of 7¼ to 18 lb. A wide range of rubber, aluminum and rubber, and malleable butts is provided, together with suitable peens.

Flue Gas Analyzer: Davis Emergency Equipment Co., Instrument Division, 45 Halleck St., Newark 4, N. J.—Flue gas analyzer is designed to indicate and continuously record stack gases as a guide to more efficient combustion. The instrument analyzes the composite of stack gases and gives a continuous indication of the completeness of combustion regardless of the fuel used. Analyzer consists of a recorder and panel 2 ft wide and 6½ ft high and a flow panel to be mounted near or at the point of sampling. It is electrically operated from 110 v, 6 c current and employs a Wheatstone bridge and a stainless steel analysis cell for measuring the thermal conductivity of the composite stack gases.

BUY FMC Aluminum... BOTTOM BOARDS

Engineered to take rough handling, offer light weight, long life and elimination of maintenance save countless hours in every installation.

- Light Weight
- Durable Construction

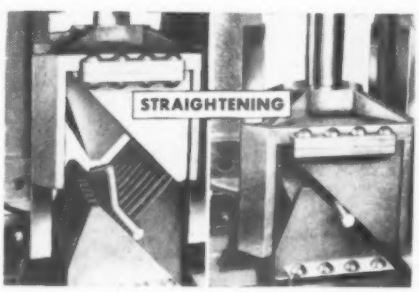
FMC is one of the oldest organizations which has commercialized ALUMINUM BOTTOM BOARDS. This organization has manufactured and shipped as many or more than any other manufacturer. Invaluable experience gained this way has taught us much about the correct metal to use, practical design, engineering, etc. FMC ALUMINUM BOTTOM BOARDS find favor in every foundry in which they are used because any foundry cost accountant will tell you that they pay for themselves in the space of a few weeks. Ask us for quotations on ALUMINUM BOTTOM BOARDS and CORE PLATES.

FOUNDRIES MATERIALS COMPANY
COLDWATER, MICHIGAN. TELEPHONE: 564
DETROIT OFFICE: D. M. PARKER BLDG., 5735 CASS AVENUE
TELEPHONE: MADISON 8921

HAND YOURSELF

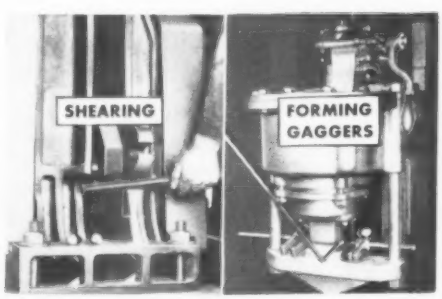
A MONTHLY DIVIDEND

The American Rod Straightener has proved itself a real dividend payer. Substantial savings of time, labor and materials are being effected by its use in hundreds of foundries. The machine is easy to operate . . . in most cases being run by unskilled labor . . . . and works as fast as material can be fed into it. Four models are available to fit your needs.



The machine makes scrap piles a thing of the past. Bent core rods are quickly salvaged, permitting their reuse many times. As rods are fed into the machine they are struck at four points simultaneously, and straightened by the action of one blow. See photo above. The shearing of rods to size and the forming of gaggers are illustrated below.

Write for Bulletin 10-B.

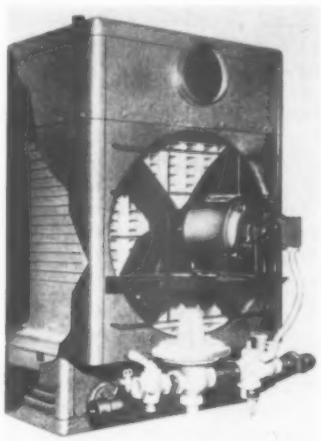


American
WHEELABRATOR & EQUIPMENT CORP.
(FORMERLY AMERICAN FOUNDRY EQUIPMENT CO.)
505 S. Byrkit St. Mishawaka, Indiana

CORE ROD STRAIGHTENER

Welding Gloves: Air Reduction Sales Co., 60 East 42nd St., New York 17, Dept. 1727P — Welding gloves are made of medium weight, chrome tanned cowhide with a one-piece leather back employing the wing type thumb construction and fabric lined cuff. Exposed seams across the back of the glove have been eliminated thereby minimizing the possibility of cuff separation. Wing type thumb is said to allow maximum thumb action without binding or pulling across the palm, and cuff lining prevents sagging or crumbling of the cuff section.

Gas Heaters: Automatic Gas Equipment Co., 301 Bruston Ave., Pittsburgh 21—Gas-fired unit heaters feature cast iron construction in both the heat exchanger and combustion chamber. Heaters have been designed to consume the right amount of air to support perfect combustion without permitting an excess of air to lower heating efficiency. Adjustable horizontal louvers direct warm air to any desired level. Heaters are equipped with a safety pilot which automatically turns off gas if pilot light goes out or burns too low to insure perfect ignition.



Underprimer: Dennis Chemical Co., 2701 Papin St., St. Louis—Quick-drying anticorrosive underprimer is designed to combine metal surface treatment with high anchorage of top coats and excellent adhesion to cold rolled steel, aluminum, nickel, copper and stainless steel. When the material is used on ferrous surfaces corrosion is said to be inhibited by phosphatization and action of the contained pigments, resulting in a strong bond and protection against underfilm corrosion. The air-drying underprimer can be used with practically all conventional finishing materials it is claimed.

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FOUNDRY EQUIPMENT: Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.—Bulletin FY-153 describes a number of types of equipment for mechanical cupola charging. Bulletin FY-152 deals with equipment for suppressing cupola sparks and fumes. Bulletin FY-154 illustrates and describes impact pulverizers. Bulletin FY-155 covers annealing ovens and the use of circulating fans and water cooling coils to control cooling in the ovens. Bulletin FY-156 describes a wet type dust suppressor.

FOUNDRY PRACTICE: Foundry Services Inc., 280 Madison Ave., New York 16—Company news bulletin No. 15 lists investigations made by the company for the foundry industry and offers detailed information on each subject. It contains short discussions on manganese bronze casting alloy, applications of asbestos in the foundry, and the production of brass permanent mold castings. Also included are a guide to the company's products and an analysis of these products.

STEEL CHAIN: American Manganese Steel Division, American Brake Shoe Co., 389 East Fourteenth St., Chicago Heights, Ill.—Bulletin 742-CN contains comprehensive information on austenitic manganese steel chain and its characteristics. Factual data show advantages and economies of manganese steel chain for heavy duty applications. The company's research and production facilities are described and illustrated.

BUYERS' GUIDE: International Nickel Co. Inc., 67 Wall St., New York 5—Buyers' guide presents the facilities, specialties and locations of authorized producers of the company's nickel-chromium white alloy cast iron. Included is an abrasion problem questionnaire for submitting information on a foundry problem. Recommendation of a suitable material to help solve the problem will be made.

SCIENTIFIC INSTRUMENTS: American Instrument Co., 8024 Georgia Ave., Silver Spring, Md.—Catalog 48 describes numerous scientific instruments for use in chemical, biological, physical, metallurgical, engineering and materials testing laboratories. The catalog is illustrated and includes comprehensive data on general laboratory equipment for research, testing and quality control.

RINGS: Crane Packing Co., 1800 Cuyler Ave., Chicago 13—Engineering manual describing "O" ring seals contains tabulations of compound specifications, dimensional standards and data on applications, installations, etc., plus drawings showing typical problems of "O" ring usage.

FLEXIBLE TUBING: Titeflex Inc., 679 Frelinghuysen Ave., Newark 5, N. J. — Catalog 113 deals with flexible bronze tubing for nominal steam pressure applications, monel and stainless steel tubing for higher temperatures and corrosion resistance, inconel tubing for extremely high temperatures as well as brass tubing. Specifications for standard fittings and illustrations of typical assemblies with these fittings are included. Catalog also describes bendable pipe, high frequency conductors and vibration eliminators.

CORROSION RESISTANT MATERIALS: Fischer & Porter Co., Dept. 9L-L, Hatboro, Pa.—Bulletin 97 gives detailed recommendations on construction materials for almost 400 different corrosive liquids and gases. Although designed specifically for selecting materials to be used in the company's flowmeters the information is helpful in selecting construction materials for other types of equipment.

MANAGEMENT ENGINEERING: Emerson Engineers, 30 Rockefeller Plaza, New York 20—Brochure entitled "Your Production Problems" is intended to acquaint executive management with the ways in which the company can assist management in its efforts to secure satisfactory operating results. Case histories of the company's work in various industries are cited.

MAGNETIC SEPARATORS: Dings Magnetic Separator Co., 4740 West McGeogh Ave., Milwaukee 14—Bulletin B-1009A lists special features, typical applications and a table of dimensions and capacities covering the company's permanent pulley magnetic separator designed to separate magnetic and nonmagnetic dry materials automatically.

GRINDERS: Hammond Machinery Builders Inc., Dept. GP-37, 1600 Douglas Ave., Kalamazoo, Mich.—Catalog 325 presents information and illustrations on the company's abrasive belt grinder-polishers, polishing lathes, backstands, wheel grinders and grinder accessories. Suggested applications for coated abrasives also are given.

ELECTRODE GUIDE: Air Reduction Sales Co., 60 East 42nd St., New York 17 — Thumb indexed pocket guide to the company's arc welding electrodes contains facts pertaining to the most commonly used Airco electrodes and helpful data regarding the factors to be considered when choosing an electrode for a specific job.

CLEANING ABRASIVE: Cleveland Metal Abrasive Co., 887 East 67th St., Cleveland 8—Bulletin 48 contains charts showing tolerances which control uniformity of the various sizes of the company's shot and grit.

USES OF VACUUM: Spencer Turbine Co., Drawer E, Station A, Hart-

ford 6, Conn.—Illustrated bulletin 144 suggests special applications of vacuum in industry. It describes the removal of liquids, gases, precious metals and dusts, and shows how vacuum can be used to convey materials at a rate of up to 4 tons per hr.

CASTINGS COST: Belle City Malleable Iron Co., 1442 Forest St., Racine, Wis.—Folder 6 in the company's malleable iron series discusses modern foundry technique for handling customers' orders and stresses methods and procedures for insuring close adherence to specifications.

FIRE EXTINGUISHERS: Ansul Chemical Co., Fire Extinguisher Division, Marinette, Wis.—Catalog illustrates and describes the company's line of dry chemical fire extinguishers and contains charts showing the characteristics of approved hand fire extinguishers.

SHAKEOUTS: Robins Conveyors Division, Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J.—Bulletin 124-B describes the company's full floating foundry shakeout and lists dimensions and capacities of various models. Other company products for the foundry industry also are described.

FURNACES: Stroman Furnace & Engineering Co., division of Petersen Oven Co., 9900 Franklin Ave., Franklin Park, Ill.—Bulletin 700 Describes and illustrates a portion of the company's line of melting and holding furnaces for ferrous and nonferrous metals.

ALLOYS: Vanadium Corp. of America, 420 Lexington Ave., New York 17—Folder describes chromium alloys balanced with manganese and silicon for use as additions to gray cast iron. Information on composition, purpose, application and results of additions is included in the folder.

CONVEYOR EQUIPMENT: Palmer-Bee Co., Westminster at Grand Trunk Railroad, Detroit 12—Booklet describes bearings which are said to require no lubrication during their life. These bearings are for use on conveyor equipment which also is described and illustrated.

HOUSE ORGAN: R. Lavin & Sons Inc., 3426 South Kedzie Ave., Chicago 23—Four times a year the company publishes its house organ which contains timely editorial items coupled with informative technical information. It is offered to interested readers.

PALLET TRUCKS: Yale & Towne Mfg. Co., Philadelphia Division, 4530 Tacony St., Philadelphia 24—Bulletin P-673 contains information on pallet system applications, hand lift and electric powered pallet trucks, and recommended pallet design.

MOLDING MACHINES: Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35—Bulletin 454 contains illustrations, specifications and descriptive literature about the company's line of molding and coremaking machines.

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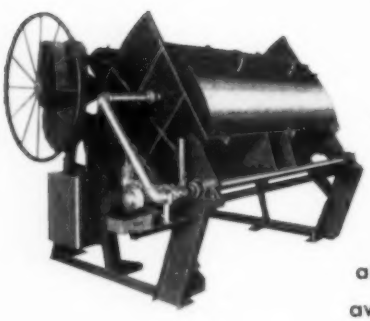

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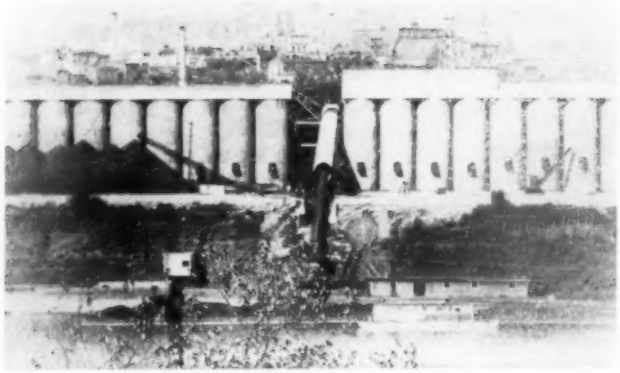

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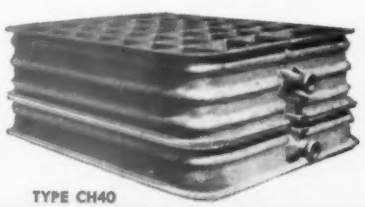

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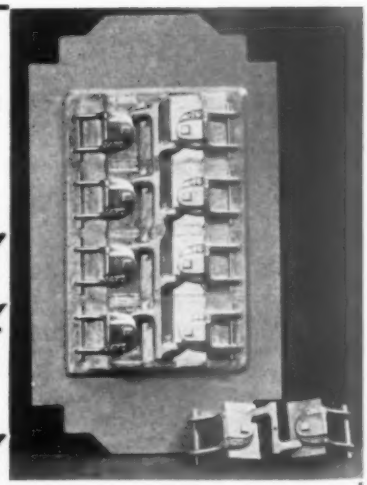

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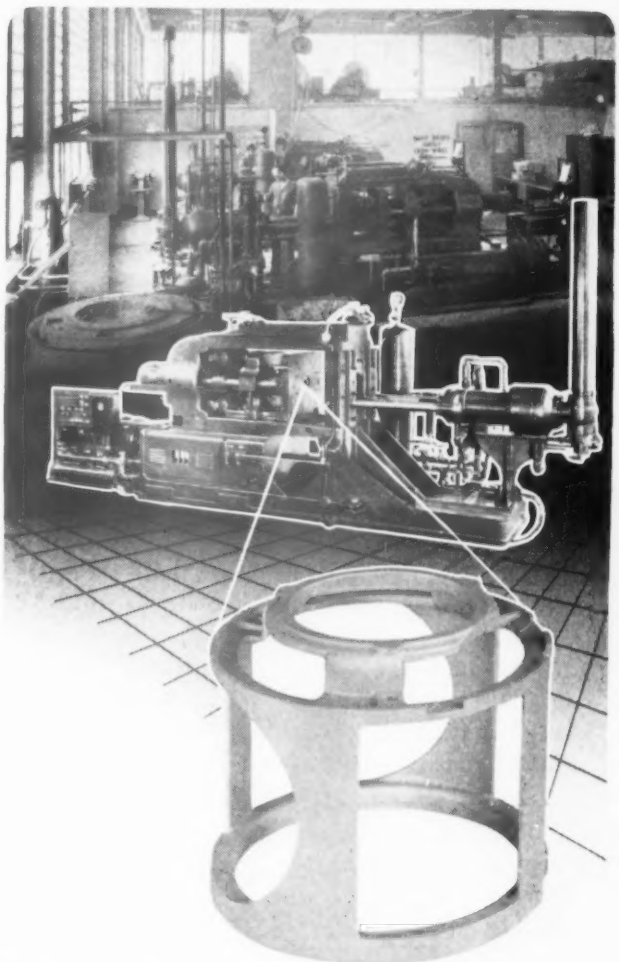

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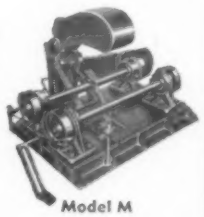
Model J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These machines used to make ferrous and non-ferrous centrifugal castings are produced by the pioneer manufacturer of such equipment.

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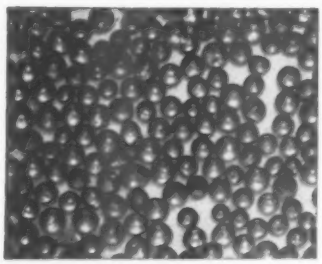

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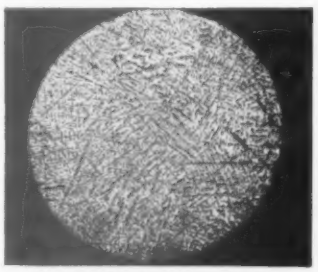

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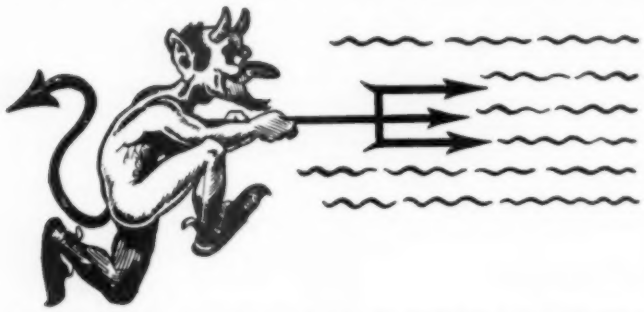
★ For Ferrous and Non-Ferrous Metals ★



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SOFFEL'S NEW WATERPROOF THERMOTOMIC COMPOUND is an exothermic insert molding material which produces a temperature of 3500° F. Known as THERMOTOMIC WP, this new waterproofed material is molded and baked into any desired shape in much the same manner as ordinary sand cores. When dry, THERMOTOMIC WP cores are highly resistant to moisture pick-up and may be placed in green sand molds many hours before pouring without absorbing moisture. This is of interest to every foundry where it is routine practice to allow completed molds to stand overnight or longer before pouring.

THERMOTOMIC WP is used as ring inserts under risers or feeding heads where its exothermic action serves to raise the temperature of the feeding metal thus assuring adequate feeding while the casting cools and solidifies. In this manner, pipe and shrink cavities caused by premature freezing of the feeding metal are eliminated. THERMOTOMIC WP readily lends itself to many other applications. It is used as facing inserts or as a facing application in molds where it is desirable to maintain the metal in a liquid state for an extended period of time; in gate cores or strainer cores, and at the juncture of light sections with heavy sections to equalize the rate of solidification of the metal, thus preventing internal strains or shrink cracks. After having burned out, THERMOTOMIC WP retains its original shape and becomes a refractory insulator. Because of reduced riser dimensions and the restricted feeding neck of one or one and one-half inches made possible by the use of THERMOTOMIC WP, tremendous savings are realized through increased yield and reduced cleaning costs.

A large steel foundry reported a saving of $1075 on 50 castings in using THERMOTOMIC.

NOTE: For use in dry sand molds, our Non-waterproofed Standard Thermotomic is recommended as usual. Write for descriptive booklet on SOFFEL'S THERMOTOMIC PROCESS for full particulars.

SOFFEL'S NO. 5 CARBON FREE LIQUIDIZER

An Exothermic Feeding Head Compound and Pipe Eliminator

In order to obtain the maximum feeding metal in the casting from the risers, it is important that SOFFEL'S NO. 5 CARBON FREE LIQUIDIZER be used in conjunction with THERMOTOMIC WP. NO. 5 CARBON FREE LIQUIDIZER is applied on the surface of the feeding metal in the heads or risers, where it enters into an exothermic reaction which raises the temperature of the feeding metal and prevents loss of heat from the surface. This action of NO. 5 CARBON FREE LIQUIDIZER keeps the feeding heads open to atmospheric pressure feeding.

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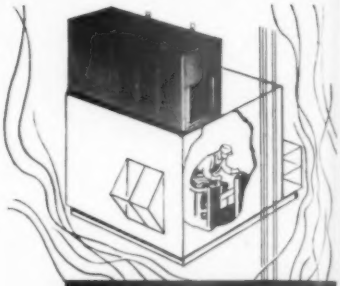
PERFORMANCE

in the **HOT** *spots*



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REPEAT ORDERS from steel, iron and non-ferrous metal producers offer proof of the outstanding results where Dravo Crane Cab Coolers reduce fatigue and improve operator performance. It's worth your while to call or wire Dravo for case history details of these applications.

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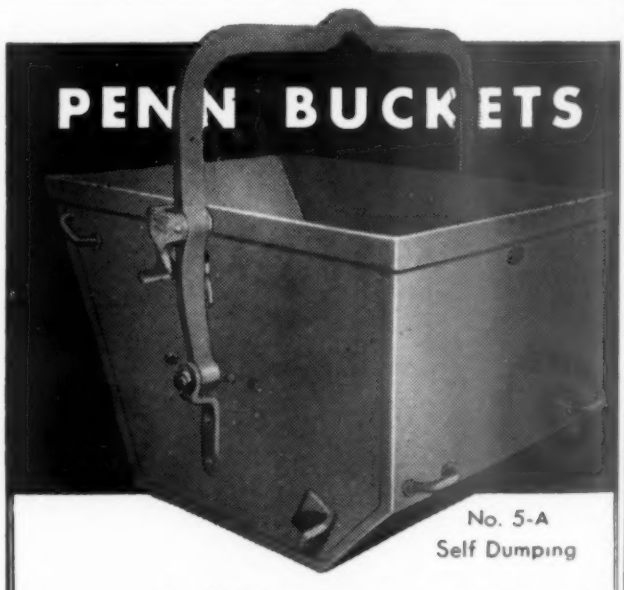

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Self Dumping

Careful balancing makes Penn Buckets self dumping when loaded and self righting when empty. Welded construction prevents "clinging" makes them empty easily and completely.

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WRITE TODAY FOR NEW BULLETIN DIMENSION SHEET AND PRICE LIST

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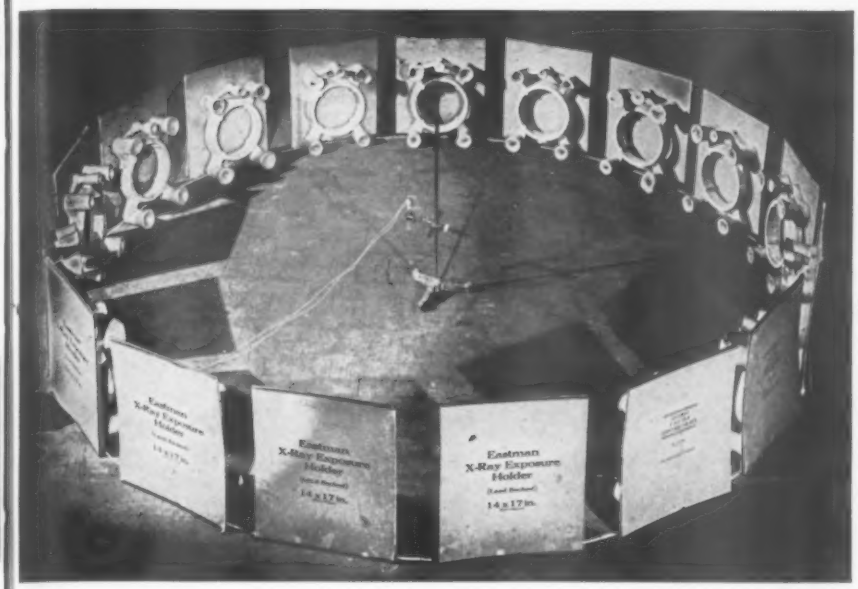
RADIUM RADIOGRAPHY *Performs a* NEW FUNCTION



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Write us concerning any problem of Gamma Ray Radiography

"Directional solidification" can easily be studied by the set-up illustrated in the photograph—to indicate the best method of casting with a minimum of defects in the casting itself.

Radium has become a new foundry tool which directly effects an increase in yield. It permits accurate determination of the proper procedure in gating and risering "tough" castings. Seventeen cylindrical castings were radiographed simultaneously by Crane Co. to ascertain the most productive and economical foundry practice.

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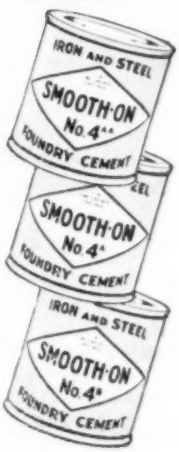
3 Shades

FOR A CLOSE MATCH with YOUR castings

When you true up surface blemishes in castings with Smooth-On No. 4 Foundry Cement, you can make a close match in color and texture. For light colored, fine grained castings use Smooth-On No. 4AA, which will also take a machined finish. For medium gray metal choose No. 4A. For dark gray, coarser grained pieces you'll find Smooth-On No. 4B a match. Experienced foundrymen use Smooth-On Foundry Cements regularly to fill in harmless but disfiguring sand and blow holes, pock-marks, porous spots and small dents. If your supply house hasn't Smooth-On No. 4 Foundry Cements, write us.



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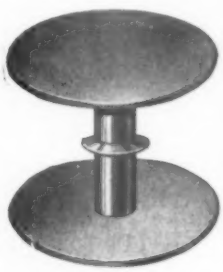
Do it with **SMOOTH-ON**
FOUNDRY CEMENT

IMMEDIATE FUSION WITH MOLTEN METAL PREVENTS LEAKS

Buffalo "LEEK-PRUF" CHAPLETS

In both Double (shown) and Single Head types of "Buffalo" *LEEK-PRUF* Chaplets, the chief factor of efficiency is the exclusive fin design.



Integral with the stem, this extremely thin section protrudes to its full width. There is no recess in the stem to cause weakness. The advantages of this original fin design speak for themselves.

- Positive fusion with molten metal—no chance for leakage.
- Burns in more easily.
- Does not chill molten metal.
- Stem is always full size—hence stronger.

CATALOG NO. 14
Complete information, full range of sizes, on double and single head (round or square) chaplets, as well as many other types.
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• "Your guarantee of uniform quality since 1924."

Prove to your own satisfaction by *actual trial*, what hundreds of foundries have discovered . . that you get better cores at lower cost by using DAYTON CORE OIL. As a result, you get cleaner, more uniform castings. Our representatives are trained by years of experience to help you solve your core production problems. Order a drum of Dayton Core Oil . . test it! We believe you'll want to use it exclusively thereafter.

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The Favorite Blades of Non-Ferrous Foundries for Over 20 Years

You will profit by using the tougher Atlantic blades for clean, speedy cutting of gates and risers from castings. You can eliminate unnecessary grinding operations—our specially milled tooth construction makes it easier to cut closer to the body of the casting. All Atlantic Metal Cutting Band Saws are guaranteed as to material, workmanship and temper.

Send for Atlantic Band Saw Catalog,
describing foundry cut-off operations.

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Exclusively Band Saw Production

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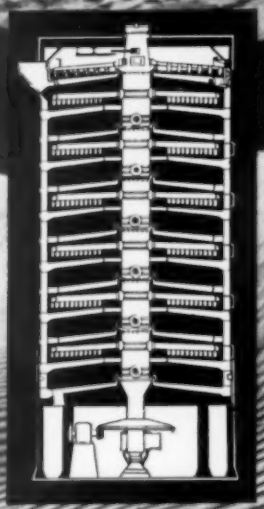
N E R C O

Sand Reclaiming Units



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Use The Simplified PYRO Optical Pyrometer

Any operator can quickly determine temperatures on minute spots, fast-moving objects and smallest streams with the simplified PYRO Optical Pyrometer. Completely self-contained—no calibration charts or accessories needed. An accurate, DIRECT-READING instrument that will pay for itself many times over by helping prevent spoilage. Weighs just 3 lbs. Available in 5 ranges (1400° to 7500° F.) *Write for FREE CATALOG #80, today!*

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(PATENTED)

Buckeye "Three-In-One" Patented Flask Guides positively prevent the cope from being rocked or shifted while being lifted from the drag!

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BLAW-KNOX DIVISION
OF BLAW-KNOX COMPANY
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PITTSBURGH 22, PA.

BLAW-KNOX *FOUNDRY* BUCKETS

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JOLT SQUEEZER

FULLY EQUIPPED

• The post and squeeze cylinder on the HAYNES JOLT SQUEEZER is cast all in one piece. There are no bolts or screws in this machine. The top of the post is machined on top with a 2 7/16" cold rolled shaft which the swing arm swings on.

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AN IDEAL FUEL FOR DRYING MOLDS

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Order now from your distributor, or write the Ford Motor Company, Sales Department, Iron Mountain, Michigan.

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SPECIAL HIGH SILICON GRADES

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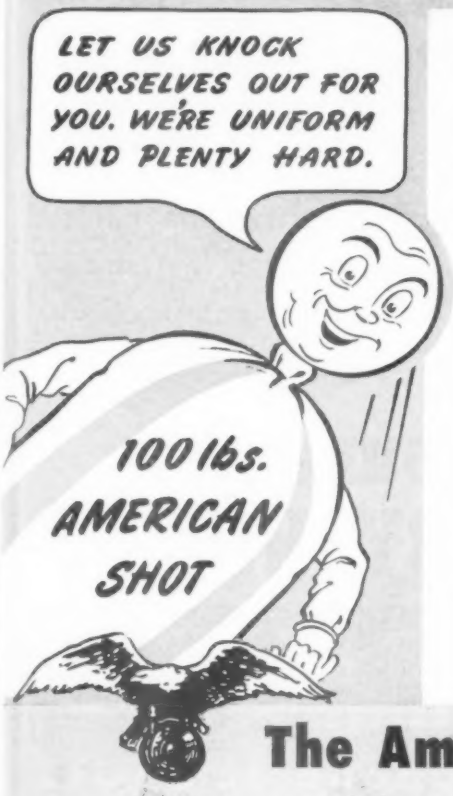
GLOBE IRON CO JACKSON, O.

SHOT and GRIT... by AMERICAN STEEL



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American Steel Shot and Grit give you top blast cleaning performance because American's own method of manufacture assures you of uniformity of size and hardness in every abrasive pellet. American Abrasives last longer, clean faster, *never break apart*. You get maximum economy in your blast cleaning operations. American Shot and Grit is graded to all S.A.E. specifications . . . comes in 100-lb. bags.

The American Steel Abrasives Company

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BY WM. A. ROSENBERGER

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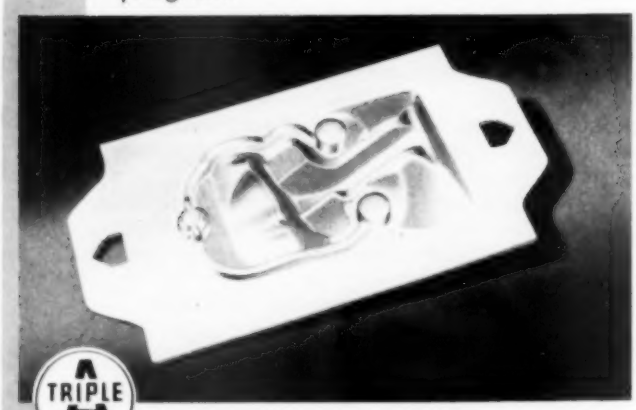

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For Every Need!

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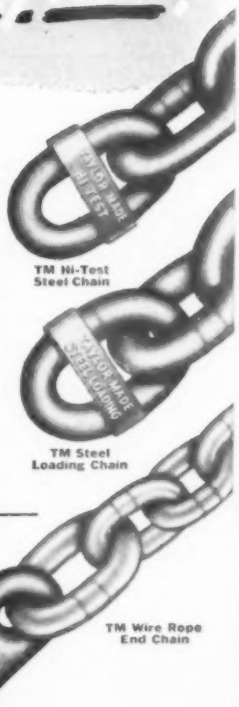

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for ALUMINUM AND OTHER NONFERROUS METALS. 45 SIZES.

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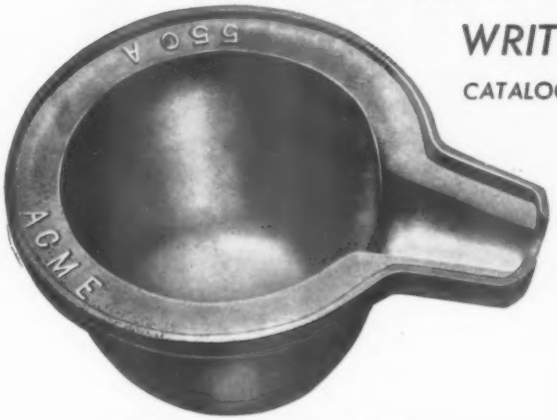
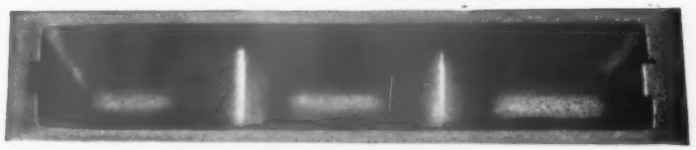


ROUND SPOUT POT NO. 550A
WITH 1½" COLLAR ON FLANGE

HOLDING BOWL NO. HP7001



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ACME FOUNDRY COMPANY

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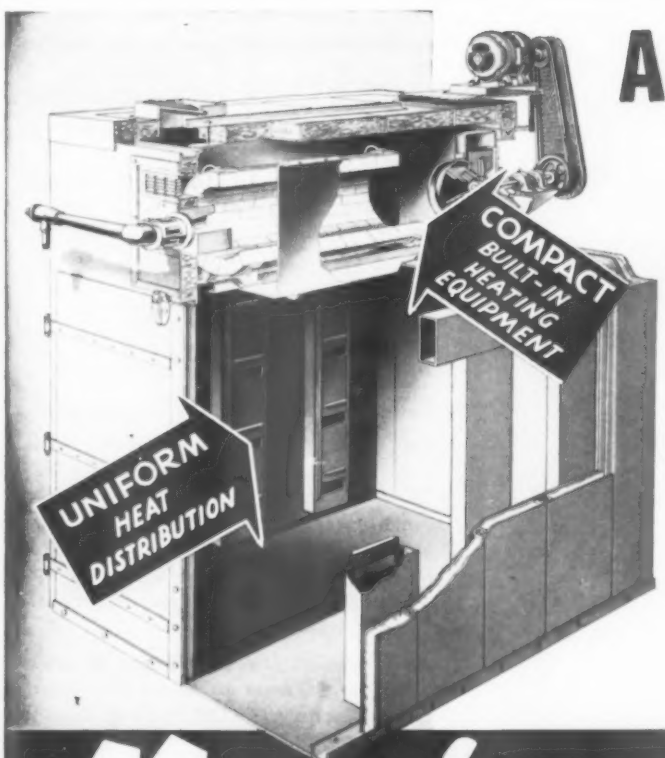

Announcing the New-

Morrison CORE OVEN

MORE PRODUCTION—with Uniformity . . . Speed
LESS COSTS—mean Fuel Savings . . . Space Savings

The new MORRISON standard Oven is designed for core-baking, mold-drying, and similar applications requiring maximum uniformity obtained by forced convection of heated air.

The MORRISON method of uniform heating by forced convection is also ideal for curing plastics, baking paint and enamel finishes, and other processing of materials up to 750° F.

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CORE WORK, SAND FACINGS, SPRAYS

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Producers of
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CHAPLETS
and all types of nails
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We Use BUFFALO BRAND VENT WAX

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Write for generous free sample.

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VENT WAX
UNITED COMPOUND COMPANY
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PRODUCTION
of
GREY IRON CASTINGS

ONE OF THE NATION'S
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ESTABLISHED 1866
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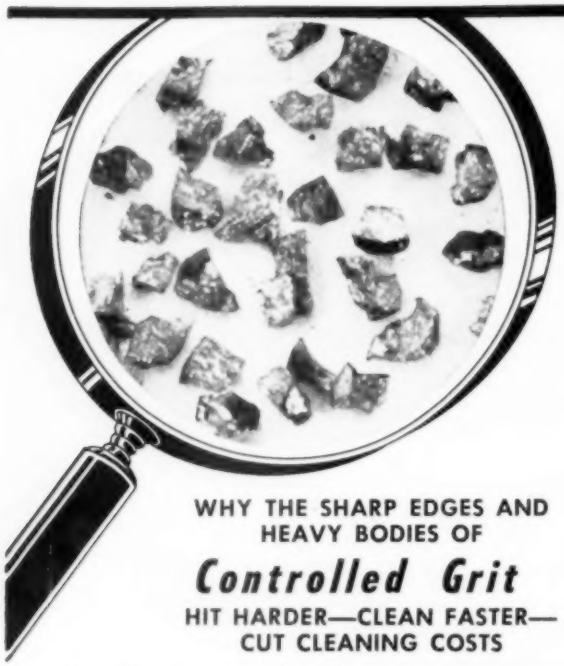

WHY THE SHARP EDGES AND HEAVY BODIES OF

Controlled Grit

HIT HARDER—CLEAN FASTER—
CUT CLEANING COSTS

Shown here is a very clear idea of the reasons "Controlled Grit" does a better, faster job of cleaning. Chunky bodies like these back up the sharp edges with solid weight, and solid weight hits harder, cleans faster.

MEMBER

MANUFACTURER'S ASSOCIATION INC. FOUNDRY EQUIPMENT

Only Clean Castings PAY OFF!

The only profitable castings, as every foundryman knows, are those on the shipping platform. Every casting that must back track for re-cleaning cuts profits, piles up costs. No matter what savings in abrasive costs may be, it takes only a few returns to wipe it all out, put the cleaning room 'way in the red.'

That's why so many Foundrymen use controlled Grit. They know it takes sharp edges to clean clean and the sharp edges and heavy bodies of Controlled Grit hit harder, clean faster and cleaner, show lower month-in-month-out cleaning costs.

Find out what Controlled Grit can do for your cleaning costs. Send for samples and full information today.

Now Being Manufactured By

National Metal Abrasive Co.
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SOLD EXCLUSIVELY BY

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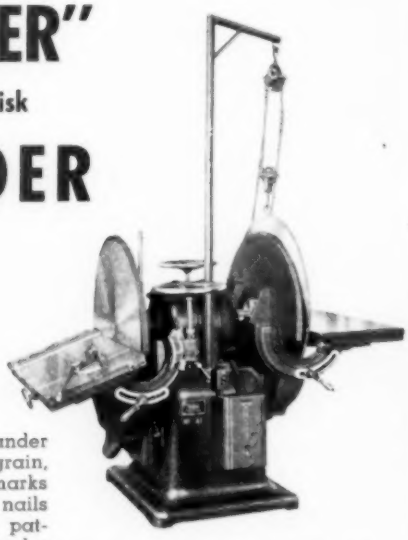
CLEVELAND NEW YORK INDIANAPOLIS CHICAGO
PITTSBURGH CINCINNATI ST. LOUIS PHILADELPHIA DETROIT

Sand your pattern pieces, large and small, nails and all, on this

"OLIVER"

Double Disk

SANDER



This "Oliver" Sander smooths up end grain, removes saw marks and sands down nails left in salvaged patterns. The Sander comes with two disks 37½" diameter. Equipped with motor-in-head or belt drive. Tables have 2" lateral adjustment, to 45° angular adjustment. *Write for Bulletin 41D.*

OLIVER MACHINERY COMPANY

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HELPFUL LITERATURE

NOTE TO READERS: If you will check the item or items described which particularly interest you, we will be glad to request the manufacturers concerned to send you their literature. Use the attached postal card.

1. Foundry Shakeouts

Robins Conveyors Div., Hewitt-Robins Inc.—16-page illustrated bulletin No. 124-B is devoted to details of full-floating Floatex foundry shakeout. Unit has positive action, is fully mechanical and self-discharging. Also covered is Maltese Cross Fiberglas Hot Sand conveyor belt which is made from specially compounded covers, frictions and layers, and has Fiberglas in carcass.

2. Welding Electrodes

Arcos Corp.—Data sheet No. 44822 provides technical information and analyses of eleven alloy electrodes for use in fabrication welding and salvage of both high and low alloy castings. Both corrosion resisting and heat resisting alloys are included, together with ACI casting designations by type. Also tabulated are tensile properties and weld metal composition.

3. Refractories

Carborundum Co., Refractories Div. —40-page illustrated publication "Super Refractories for Heat Treatment Furnaces" provides information on refractories for use in small oven furnaces, large furnaces, ovens with artificial atmosphere, salt bath furnaces, sheet and strip annealing furnaces and car type annealing furnaces. Dimensions of brick and tile are included.

4. Foundry Flasks

Industrial Fabricating, Inc.—12-page illustrated catalog "Industrial Champions" gives construction details and general information on line of flasks which are individually styled to accommodate all types of molding methods. Sandstrip rail offers full width bearing surface at parting line that will not crack or curl under jolt or mechanical shakeout action.

5. Industrial Financing

CIT Corp. — 12-page illustrated publication "Working Capital For Industry" presents an actual case history of how working capital can be supplied to an industrial organization for purchase of machinery and equipment, for refinancing by consolidation of outstanding obligations, or for acquiring another concern.

6. Cranes

Thew Shovel Co.—16-page illustrated form No. 1450727 outlines modern materials handling operations utilizing self-propelled Lorain cranes. Units are shown handling almost every conceivable type of product from baled materials to timber.

7. Coated Molding Sand

Eastern Clay Products, Inc.—6-page illustrated folder "Westonite" outlines features of chemically coated molding sand. Sections of folder deal with cleaning, mulling, finish, shake-out, casting tolerance, scrap loss and other vital molding subjects and explains how they are affected by this molding sand.

8. Silica Firestone

Cleveland Quarries Co.—4-page illustrated folder No. 63 deals with seven profitable ways in which Buckeye silica firestone can be utilized. Cupola blocks and liners, split rock linings and patching, slag hole blocks and ground silica firestone are described.

9. Welding Electrodes

Air Reduction Sales Co.—36-page illustrated vest-pocket size publication "Pocket Guide to Electrodes" presents facts pertaining to most commonly used Airco electrodes along with helpful data regarding factors to be considered when choosing an electrode for a specific job.

10. Sander Head

Vonnegut Moulder Corp.—8-page illustrated vest-pocket size bulletin No. 59 deals with newly designed brush-backed sander head for metal working operations. Unit is especially applicable for following contours of intricate pieces.

11. Vanadium Products

Vanadium Corp. of America—40-page illustrated catalog "Vancoram" is devoted to descriptions of ferro-vanadium, ferro-silicon, ferro-titanium and other alloys, chemicals, metals and carbides. Melting temperatures of some of the ferro alloys are presented.

12. Hydraulic Sandslinger

Beardsley & Piper Div., Pettibone Mulliken Corp.—4-page illustrated folder "Hydra-Slinger" presents information on this stationary type sandslinger which has hydraulic power for controlling and directing movement of ramming arms. Unit provides for maximum production in molding operations where flasks and patterns move into ramming area.

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13. Electric Cable Hoists

Lisbon Hoist & Crane Co.—8-page illustrated catalog "Bob-Cat Electric Hoists" describes these units as high grade heavy duty hoists which are compact, lightweight and capable of handling maximum loads. Catalog gives dimensions and general specifications.

14. Refractories

Robinson Clay Products Co.—34-page illustrated "Catalog of Refractories" presents information on Flintex, Robinson, Ohio Woodland, No. 1 Savage, Cupola block and W. W. Co. brands of firebrick. Blocks are charted for standard sizes and shapes.

15. Foundry Equipment

Simplicity Enginering Co. — 16-page illustrated bulletin No. F-5 shows and describes line of foundry equipment including light, medium and heavy duty shakeout screens; sand screening units; lump crushing machines; and gyrating conveyors. Sizes, capacities and other engineering information are included.

16. Exothermic Products

Exomet, Inc.—16-page illustrated publication "Exothermic Metallurgical Products" is descriptive of Risotherm, Ladletherm, Ingotherm, Exoweld and Exocast materials. Drawings show actual comparisons of use, and typical castings produced utilizing these additives are shown.

17. Electric Furnace

Kuhlman Electric Co., Detroit Electric Furnace Div.—28-page illustrated bulletin No. 473 is descriptive of automatic Detroit Rocking electric furnace for melting brass, bronze, copper bearing metals, zinc, nickel, Monel, gray iron, white iron, stainless and special alloys. Furnaces are shown in operation, and publication includes performance charts and general operating information.

18. Ball Peen Hammers

Heller Brothers Co.—4-page illustrated vest-pocket size folder No. 30 reveals sizes and describes peen, octagon poll, eye, handle and face of ball peen hammers which are available in sizes up to 2½ pounds.

19. Ceramic Nozzle

George Pfaff, Inc.—4-page illustrated folder "Pyramid Ceramic Nozzle Cents Appeal" deals with line of nozzles developed for sand blasting operations, glass and stone carving and similar jobs. Air consumption, prices and nozzle sizes are charted for reference.

20. Abrasive Belt Machines

Porter-Cable Machine Co.—20-page illustrated miniature catalog No. 666 is descriptive of complete line of abrasive belt machines as well as line of portable electric tools. Applications and economies possible with abrasive belt machines are described. Backstand idlers are covered also.

21. Foundry Flasks

Hines Flask Co.—40-page illustrated catalog and 48-page illustrated price list No. 16 describe complete line of foundry flasks and tabulate prices of various styles and sizes. Details are given on standard, medium weight and heavy duty aluminum slip and pop-off flasks; aluminum and cast-iron jackets; special flasks and accessories.

22. Mechanical Chargers

Whiting Corp.—32-page illustrated bulletin No. FY-153 presents specifications and operating data on side vertical skip, underslung, skip hoist, monorail, jib, swivel skip, horseshoe trolley, gantry and overhung cranes for use in mechanical charging operations.

23. Permanent Mold Castings

Eaton Mfg. Co., Foundry Div.—20-page illustrated catalog "A Quick Picture of the Eaton Permanent Mold Process for Producing Gray Iron Castings" deals with qualities of castings produced, how they are produced, adaptability to products, and how they provide production economies.

24. Pneumatic Conveyors

Convair Corp.—8-page bulletin No. 101 contains numerous drawings which reveal installation data and general operating information on Convair pneumatic conveying systems for chemical, food, glass, steel and allied industries.

25. Hose Fittings

B. F. Goodrich Co.—6-page illustrated catalog section No. 3100 provides instructions for attaching couplings to hose, and includes tables which show various recommendations for different types of hose. Fittings described are for diversified lines of hose. Available sizes are listed.

26. Dust Control Units

American Air Filter Co.—4-page illustrated folder No. 278A is descriptive of AAF furnace hood which is designed for use in conjunction with type N Roto-Clone dust collector to control dust and smoke from electric melting furnaces.

27. Pneumatic Vibrators

Cleveland Vibrator Co.—12-page illustrated catalog No. 104 deals with line of pneumatic vibrators. Heads are hardened to withstand powerful blows developed by oscillation of piston. Specifications are charted and various types of mountings are shown and described.

28. Melting Furnace

Sawyer Bailey Corp. — 8-page illustrated vest-pocket size publication "Foundry Jr." describes the Foundry Jr. melting furnace which is capable of making castings of aluminum, brass, bronze, copper, cast iron, silver, zinc, tin, lead and any alloys. Furnace has 8½ x 9½-inch combustion chamber and will accommodate large No. 10 crucible holding approximately 100 cubic inches of red brass.

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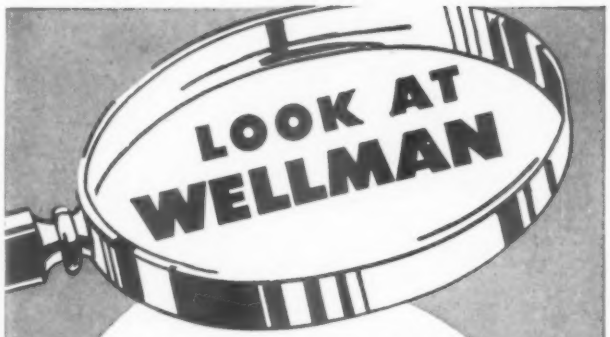

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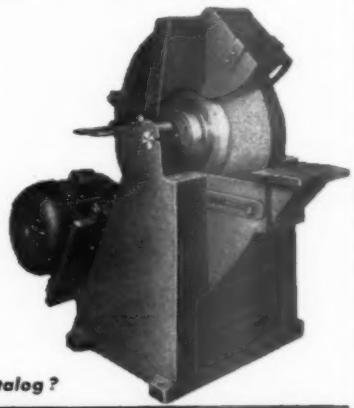

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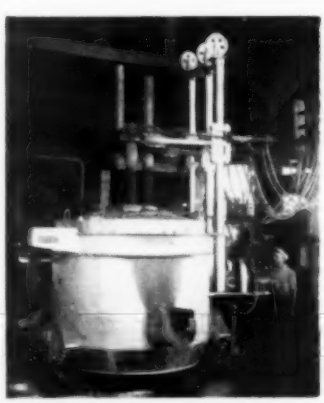

The furnace shown is one of our latest V-7 (7ft. I.D. shell) 3 Phase, 1200 KVA Greene Arc Furnaces for melting steel. Melts a 3 ton single charge in 2 hours with 900 KW demand; has improved extra high cone type shell; embodies our improved One-Way-Arch Roof with steel skews (patents pending) using all standard shapes except six pieces forming the 3 electrode holes; has our simple arc-length and arc-voltage control (patented). This furnace was in operation less than 3 months after date of order and is the 5th Greene Furnace for this foundry. Door and Top Charge Furnaces ½ to 25 tons available.

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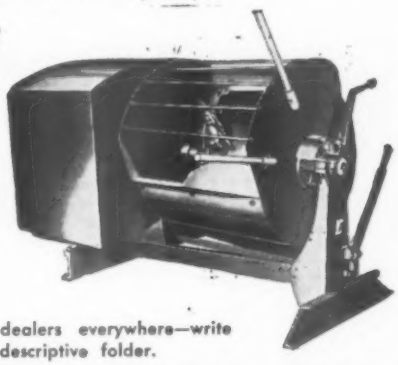

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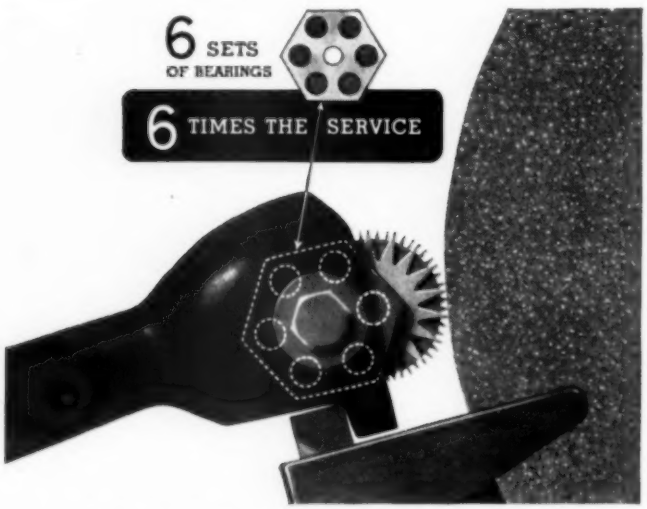

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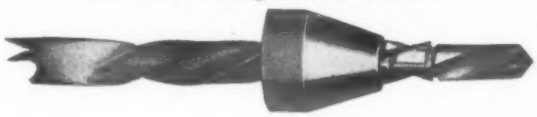

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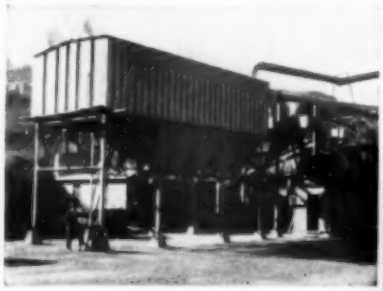

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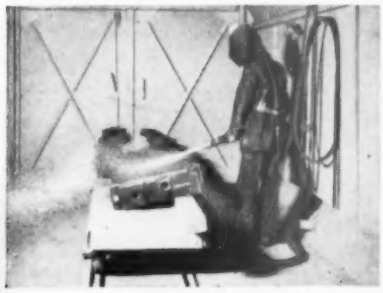

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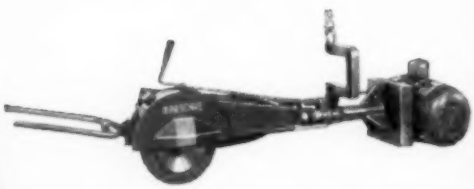

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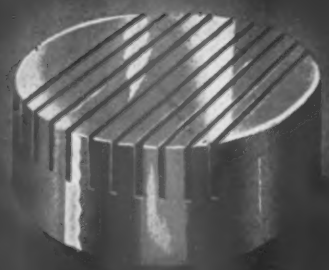

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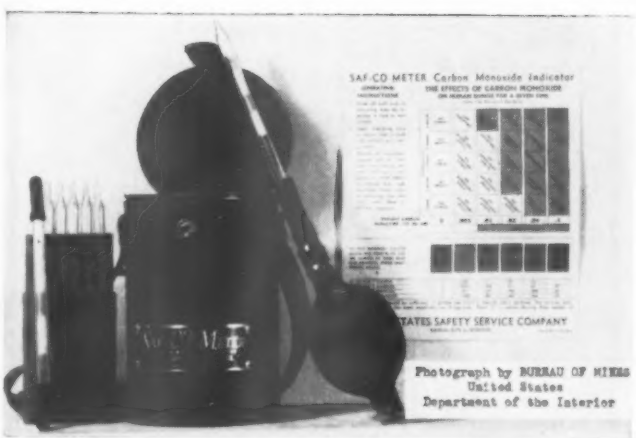

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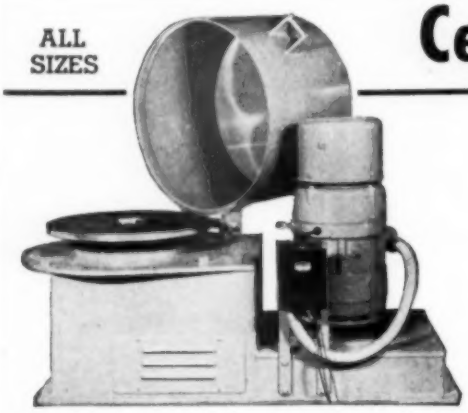

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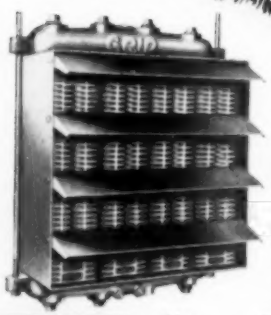

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Newcomb-Detroit Co., Inc., 5741 Russell St., Detroit 11, Mich.
Pangborn Corp., Hagerstown, Md.
Parsons Engineering Corp., 2545 E. 79th St., Cleveland 4, O.
Reumelin Mfg. Co., 3860 N. Palmer St., Milwaukee 12, Wis.
Schneible Co., Claude B., 2827-25th St., Detroit 16, Mich.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
Westinghouse Electric Corp., B. F. Sturtevant Div., 40 Wall St., New York 4, N. Y.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

DUST COLLECTORS

Newcomb-Detroit Co., Inc., 5741 Russell St., Detroit 11, Mich.
Schmieg Industries, 6560 Cass Ave., Detroit 2, Mich.
Claude B. Schneible Co., 2827 25th St., Detroit 16, Mich.

DUST COLLECTOR (Shake-out)

Newcomb-Detroit Co., Inc., 5741 Russell St., Detroit 11, Mich.

DUST RECOVERY SYSTEMS

American Wheelabrator & Equipment Co., Mishawaka, Ind.

DUST RECOVERY SYSTEMS (Cont'd.)

Kirk & Blum Mfg. Co., Cincinnati 25, O.
Parsons Engineering Corp., 2545 E. 79th St., Cleveland 4, O.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

DYES & CHEMICALS

Eaton Chemical & Dyestuff Co., 1490 Franklin, Detroit, Mich.

ELECTRIC FURNACES (see Furnaces, Electric)

ELECTRODES (Graphite and Amorphous)

International Graphite & Electrode Corp., St. Marys, Pa.
National Carbon Co., Inc., Electrode Sales Div., 30 E. 42nd St., New York 17, N. Y.

ELEVATORS

Standard Conveyor Co., North St. Paul 9, Minn.

ELEVATORS (Bucket)

Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, O.
Chain Belt Co., 1671 W. Bruce St., Milwaukee 4, Wis.
Jeffrey Mfg. Co., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chiago 9, Ill.
National Engineering Co., 549 W. Washington St., Chicago 6, Ill.
Newaygo Engineering Co., Newaygo, Mich.

ELEVATORS (Material Handling)

Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

ELEVATORS (Pneumatic, Material Handling)

Fuller Co., Catasauqua, Pa.

ENGINEERING SERVICE (Foundry)

Carman, Edwin S., Lee Rd. at Mayfield, Cleveland 18, O.
Frank D. Campbell, 332 So. Michigan Ave., Chicago, Ill.
Conover Engineering Co., 1740 East 12th St., Cleveland 14, Ohio.
Engineering Service Inc., 610 West Michigan St., Milwaukee 3, Wis.
Giffels & Vallet, Inc., Marquette Bldg., Detroit, Mich.
Lester B. Knight & Associates, Inc., 600 West Jackson Blvd., Chicago 3, Ill.
A. H. Putnam Co., 1319 2nd Ave., Rock Island, Ill.
Reichert, W. G., Engineering Co., 1060 Broad St., Newark, N. J.
Westover Engineers, 424 E. Wells St., Milwaukee 2, Wis.
Wickland Co., A. A., 205 W. Wacker Dr., Chicago 6, Ill.

ENGINEERING SERVICE (Permanent Mold)

Industrial Pattern Works, 2621 Belmont Ave., Chicago 18, Ill.
Master Pattern Co., 1315 Main Ave., Cleveland, Ohio.

EXHAUST SYSTEMS

American Air Filter Co., Inc. Louisville 8, Ky.
American Wheelabrator & Equipment Co., Mishawaka, Ind.
Newcomb-Detroit Co., Inc., 5741 Russell St., Detroit 11, Mich.
Pangborn Corporation, Hagerstown, Md.
Parsons Engineering Corp., 2545 E. 79th St., Cleveland 4, O.
Propellair Inc., Springfield, O.
Schmeig Industries, 6560 Cass Ave., Detroit 2, Mich.

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Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Westinghouse Electric Corp., B. F. Sturtevant Div., 40 Wall St., New York 4, N. Y.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

FABRICATORS (Metal)

Roura Iron Works, 1405 Woodland Ave., Detroit 11, Mich.

FACINGS

Delta Oil Products Co., Milwaukee 9, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
National Carbon Co., Inc., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.
Stevens Inc., Frederic B., Detroit 16, Mich.
Superior Flake Graphite Co., 33 S. Clark St., Chicago 3, Ill.
United States Graphite Co., Saginaw, Mich.

FANS

General Blower Co., Morton Grove, Ill.

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American Wheelabrator & Equipment Co., Mishawaka, Ind.
Joy Mfg. Co., La Del Division, New Philadelphia, Ohio.
Pangborn Corp., Hagerstown, Md.
Propellair Inc., Springfield, O.
Westinghouse Electric Corp., B. F. Steurtevant Div., 40 Wall St., New York 4, N. Y.

FEEDERS (Rotary)

Fuller Company, Catasauqua, Pa.
Link Belt Co., 300 W. Pershing Rd., Chcicago 9, Ill.
Newaygo Engineering Co., Newaygo, Mich.

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Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

FERROBORON

Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.
Molybdenum Corp. of America, Pittsburgh 19, Pa.

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Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.
Hickman-Williams & Co., Cleveland, O.
Ohio Ferro-Alloys Corp., Canton 2, O.
Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.

FERROCOLUMBIUM

Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.

FERROMANGANESE

Bethlehem Steel Co., Bethlehem, Pa.
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.
Ohio Ferro-Alloys Corp., Canton 2, O.

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Climax Molybdenum Co., 500 Fifth Ave., New York 18, N. Y.
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FERROSILICON

Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.
Globe Iron Co., Jackson, Ohio.
Jackson Iron & Steel Co., Jackson, O.
Keokuk Electro Metals Co., 429 So. 4th St., Keokuk, Iowa.
Miller & Company, 332 S. Michigan Ave., Chicago 4, Ill.
Ohio Ferro-Alloys Corp., Canton 2, O.
Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.

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Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.

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Eastern Clay Products, Inc., Jackson, O.
Harbison-Walker Refractories Co., 1745 Farmers Bank Bldg., Pittsburgh 22, Pa.
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Fremont Flask Co., Fremont, O.
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Hines Flask Co., 3431 W. 140th St., Cleveland 11, O.
Industrial Fabricating, Inc., 817 Hall St., Eaton Rapids, Mich.

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Arcade Manufacturing Div. Rockwell Mfg. Co., Freeport, Ill.
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Stevens, Inc., Frederic B., Detroit 16, Mich.

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Foundries Materials Co., Coldwater, Mich.
Freeman Supply Co., 1152 E. Broadway, Toledo 5, O.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.
Stevens, Inc., Frederic B., Detroit 16, Mich.

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Despatch Oven Co., Minneapolis 14, Minn.
Electric Furnace Co., Salem, Ohio.
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Ajax Metal Co., Philadelphia 23, Pa.
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Johnston Mfg. Co., Minneapolis 13, Minn.
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Superior Flake Graphite Co., 33 S. Clark St., Chicago 3, Ill.
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Metal Blast, Inc., 871 E. 67th St., Cleveland, Ohio.
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American Smelting and Refining Co., 120 Broadway, New York 5, N.Y.

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Gray Iron Foundres Society Inc., 1010 Public Square Bldg., Cleveland 13, Ohio.

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Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Modern Equipment Co., Port Washington, Wis.

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Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.
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Landis Mfg. Co., 2305 Hilton Rd., Ferndale, Mich.

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Dallett Co., 165 West Clearfield, Philadelphia, Pa.
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Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee, Wis.
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Nichols Co., Wm. H., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
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WELDING GAS

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Lide Air Products Co., 30 E. 42nd St., New York 17, N. Y.
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Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.
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WIRE BENDERS

Redford Iron & Equipment Co., 21315 W. McNichols Rd., Detroit, Mich.

WIRE BRUSHES

Independent Pneumatic Tool Co., Aurora, Ill.
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WIRE CUTTERS

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Redford Iron & Equipment Co., 21315 W. McNichols Rd., Detroit, Mich.

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Oliver Machinery Co., Grand Rapids 2, Mich.
Parks Woodworking Machine Co., 1546 Knowlton St., Cincinnati 23, Ohio.

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Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
General Electric X-Ray Corp., 4855 West McGeoch Ave., Milwaukee 14, Wis.
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—When writing advertisers, please mention THE FOUNDRY—

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Help Wanted

FOUNDRY SUPERINTENDENT WANTED

A top flight Foundry Superintendent who can assume complete responsibility in operating large Gray Iron Jobbing Foundry is needed by a successful, well established firm located in western New York. Required experience includes loam molding, also production in dry sand of medium and heavy machine tool castings, chemical castings, engine frames and similar types of work. In replying, state experience, background, technical qualifications and salary expectations. You may write in complete confidence because our Foundry Supervision know about this organization change.

BOX 205

THE FOUNDRY CLEVELAND 13, OHIO

SALES MANAGER
(NON-FERROUS FOUNDRY)

Must have thorough knowledge of all types of castings including DIE CASTING and PERMANENT MOLD.

This is an excellent opportunity for an aggressive sales-minded man with the desired experience.

All replies confidential.
Send complete resume to

BOX 286

REALSERVICE 110 WEST 34TH ST.

GENERAL FOUNDRY FOREMAN

Experienced in production of cored castings. Capable of supervising all operations including cupola, sand slinger, squeezers and roll overs in gray iron foundry. Experience in production of boiler and radiator castings desirable. In reply state qualifications and salary desired.

BOX 200

The FOUNDRY Cleveland 13, Ohio

FOUNDRY SUPERINTENDENT
and
FOUNDRY FOREMAN

A-1 superintendent and foundry foreman. Must be experienced in all phases of foundry and cupola operations of the manufacture of grey iron castings. Excellent opportunity for right men. All applications confidential.

BOX 192

The FOUNDRY Cleveland 13, Ohio

GENERAL CORE ROOM FOREMAN

Thoroughly experienced man capable of taking complete charge of core room. In reply state experience and salary desired.

BOX 199

The FOUNDRY Cleveland 13, Ohio

GENERAL FOREMAN FOR CORE SHOP

This is an excellent opportunity for the right man with a better than average salary arrangement. Must be capable of producing quality oil sand cores in medium to heavy range for diesel, machine tool and heavy farm equipment castings. Foundry located in Pittsburgh—Cleveland district. Address: Box 222, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY ENGINEER
OR
FOUNDRY MANAGER

Qualified in modernization, foundry practice, methods and procedure. Must be college graduate and willing to travel. Four to five years' experience. Age 30 to 45 years. Address: Box 102, The FOUNDRY, Cleveland 13, Ohio.

Help Wanted

TIME STUDY

EXCELLENT OPPORTUNITY

IN EASTERN FOUNDRY

FOR MAN WELL TRAINED

Give in detail education and experience. State age, marital status and salary expected.

BOX 190

The FOUNDRY Cleveland 13, Ohio

METALLURGIST

Gray iron foundry located in Middle West specializing in high grade medium and heavy castings requires services of experienced metallurgist. Reply by stating age, education, experience and salary desired. Address: Box 194, The FOUNDRY, Cleveland 13, Ohio.

SALES REPRESENTATIVE

Experienced brass and bronze ingot sales representatives for Mid-Western smelter. Must have following. Address: Box 188, The FOUNDRY, Cleveland 13, Ohio.

CHEMIST

To conduct core oil research in laboratory of large core oil manufacturer. Knowledge of foundry practice and core oil manufacture desirable. Address Box #183, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY AND SALES EXPERIENCE

Young man with foundry and sales experience by small established malleable foundry located in the East. Good opportunity for right party. Replies confidential. Address: Box 208, The FOUNDRY, Cleveland 13, Ohio.

NONFERROUS METALLURGIST

To assist in the supervision of a foundry and direct melting operations of special alloys. Chemical experience would be valuable. Advise experience, age and salary expected. Enclose snapshot. Location—Eastern Central. Address: Box 204, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN

Position open in eastern malleable mechanized foundry for a foundry foreman well versed in production work on small and medium malleable castings. Opportunity for advancement due to normal circumstances of retirements. Address: Box 202, The FOUNDRY, Cleveland 13, Ohio.

STEEL FOUNDRY SUPERINTENDENT

Plant located in East with capacity of 500 tons per month. Experienced in miscellaneous jobbing production of light and medium steel castings, also rigging for production quantities. Capable of taking charge of molding, coremaking and cleaning operations. Address: Box 195, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERVISOR

Must be experienced in gray iron cupola operations and practices. Some experience with centrifugal casting or pin-lift machines preferred. This is a permanent job with a production foundry. Address: Box 189, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRYMAN

Experienced and must thoroughly understand cupola practice and rigging for small jobbing foundry. Address: Box 217, The FOUNDRY, Cleveland 13, Ohio.

METALLURGIST

Metallurgist capable of operating induction ferrous furnace. Location middlewest. Address: Box 218, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

FOUNDRY MANAGER
OR
SUPERINTENDENT

Thoroughly experienced in ferrous and nonferrous and in all phases of foundry operation. Light to heavy work. Green and dry sand. Practical on molding and coremaking. Thoroughly experienced in cupola control. Well versed in grey iron metallurgy and foundry costs. Thoroughly experienced in production and executive capacities. Sales, contact and expediting experience. Neat appearing and pleasing personality. Employed as superintendent. Address: Box 887, The FOUNDRY, Cleveland 13, Ohio.

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Mature, profit-minded, dependable. Has successfully managed four companies—two taken out of the red. Available for service shortly with medium-size company requiring reliable directing ability in management, sales finance and production. Excellent experience, foundry, machine and related lines. Address: Box 871, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Twenty-eight years' experience as foundry superintendent. Practical molder. Understand cupola thoroughly. Prefer position with foundry making high grade castings. At present employed. Address: Box 122, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY OWNER
PLEASE NOTE

32 years of age, married, one child. Six years of college work. Practical experience from laborer through each job to metallurgical supervisor in malleable and grey iron on cupola, air and electric furnaces. A knowledge and some experience with molding, annealing, coremaking, management — employees relations, purchasing, sales, etc. On best terms with present employers but desire position in management or supervision. Address: Box 216, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EXECUTIVE

Experienced nonferrous foundry executive with 20 years' practical and technical background desires permanent position with greater responsibility. Thoroughly versed in all phase of modern sand, permanent mold and die casting manufacture, engineering and sales development. Excellent references. Family man, 38 years old, willing to locate wherever merit is recognized. Address: Box 223, The FOUNDRY, Cleveland 13, Ohio.

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With technical education and 20 years full responsibility in ferrous and nonferrous foundries desires permanent connection. Familiar with all details of a modern plant casting high production and jobbing work. Successful in handling labor and building an organization. Address: Box 210, The FOUNDRY, Cleveland 13, Ohio.

FOREMAN

Desires position as foreman or superintendent. Practical man. Twenty-two years' experience from molder to foreman gray iron or nonferrous, soil pipe and fittings. Prefer Western or Central New York. Address: Box 201, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

20 years' foundry experience, 11 years' supervision, molding, coremaking, cupola, sand, cleaning, 4½ years' superintendent, jobbing and production, cast and quality minded. Age 44, married. Address: Box 209, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERVISOR

Desires connection with jobbing and production foundry. 30 years as molder and foreman. Now superintendent in foundry pouring 35 to 40 ton per day. Address: Box 912, The FOUNDRY, Cleveland 13, Ohio.

GENERAL MANAGER

College graduate, married, 3 children, 34, 6 years molding, shipping and core experience in grey iron, 1 year personnel, 2 years as office manager. Available in one month. Address: Box 198, The FOUNDRY, Cleveland 13, Ohio.

Classified Advertising

Positions Wanted

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38 years of age, 18 years' practical gray iron experience. Ten years as general foreman and foundry superintendent. Good references. Address: Box 138, The FOUNDRY, Cleveland 13, Ohio.

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Practical iron foundryman. Technically trained. Experienced all phases iron casting production by partial or complete mechanization. Had charge of first class foundries producing up to 125 tons daily. Knows laboratory control of operations, costs and industrial relations. Competent estimating and contacting buyers. East or Middle West. Address: Box 980, The FOUNDRY, Cleveland 13, Ohio.

ALUMINUM PERMANENT MOLD FOUNDRY ENGINEER

TWENTY-FIVE YEARS' EXPERIENCE AIRCRAFT PARTS OR ANY INTRICATE WORK. FULL OR PART TIME. OHIO AREA OR METROPOLITAN NEW YORK LOCATION PREFERRED. ADDRESS: HAROLD C. HAASE, 557 SOUTH FOREST DRIVE, WEST ENGLEWOOD, NEW JERSEY.

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FOUNDRY ENGINEER

Desires to establish a connection with someone requiring the service of one generally experienced in a wide variety of foundry engineering work. Can furnish reference regarding the various projects with which I have been identified and the specific details of work covered. Address: Box 193, The FOUNDRY, Cleveland 13, Ohio.

PATTERNMAKER

Expert patternmaker, wood or metal. Foundry trouble shooter. Supervise qualified patternmakers or oversee and teach apprentices. Fast worker with ability to secure maximum production from shop crew. Original ideas that reduce time and costs. Old enough to have gained wide experience. Young enough to handle any job with enthusiasm and energy. Will go anywhere. Opportunity to engage good man at fair price. Address: Box 220, The FOUNDRY, Cleveland 13, Ohio.

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More than 20 years' experience specializing in plowing machines and sand mixing for all types of cores. Familiar with all kinds of core room machinery—large and small work, gas and diesel precision dry sand molds, machine tool castings. Address: Box 213, The FOUNDRY, Cleveland 13, Ohio.

SALES REPRESENTATIVE

Technically trained foundryman with four years' college work and over twenty years' work as foreman, metallurgist and superintendent desires sales connection in midwest. Extensive and varied experience in both mechanized and jobbing shops. Sales experience as foundry service engineer. Address: Box 225, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY METALLURGIST

Foundryman with 20 years' experience as metallurgist, foreman and superintendent in automotive and jobbing gray iron foundries desires position as metallurgist or troubleman in midwest. Technical training, best of references. Address: Box 224, The FOUNDRY, Cleveland 13, Ohio.

Foundry Consultant

ATTENTION: GRAY IRON FOUNDRIES

Get lower sulphur and hotter iron with less pig iron or no pay. New method of charging. Write for circulars. Address: HENRY MESSER, 1117 WILLOW AVE., SOUTH SAN FRANCISCO, CALIF.

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To cover middle west and eastern territories. We are a modern, well established foundry producing steel and alloy castings for the past forty years ranging from ¼ pound to 10,000 pounds. Commission basis. Reply stating experience and references.

SWEDISH CRUCIBLE STEEL CO.
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FOR
OHIO MAGNETS

Nationally advertised Ohio magnets are made for handling and separation of ferrous metals. Some select sales territories are still available to live representatives calling on foundries. Write today to:

THE OHIO ELECTRIC MFG. CO.
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Covering foundries, etc. Northern Pennsylvania, Eastern Ohio, to represent a national manufacturer of dust control chemicals and equipment.

S. E. GANE AND COMPANY
508 GRANT STREET
PITTSBURGH 19, PA.
GRant 2251

SALES REPRESENTATIVES WANTED

Well established gray iron foundry specializing in match plate and cope and drag work desires a commission representative in each of the following areas: 1. New England states 2. New York State 3. Ohio, Indiana, Kentucky 4. Detroit, Michigan 5. Georgia, South Carolina, Alabama. Address: Box 197, The FOUNDRY, Cleveland 13, Ohio.

Accounts Wanted

ACCOUNTS WANTED

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Open Capacity

GRAY IRON CASTINGS

Open Capacity Available

Inquiries Solicited

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OPEN CAPACITY

Open capacity in grey iron foundry. Waterfronts—burners—bench, pumper and floor work. Address: P.O. Box 321, Belleville, Illinois.

Open Capacity

OPEN CAPACITY

GREY IRON

CASTINGS

BILLIARD MACHINE & TOOL CO.

Mansfield, Penna.

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New central Ohio foundry has open capacity for all kinds of jobbing and production work. Address: CENTRAL FOUNDRY CO., 1124 GIBBARD AVE., COLUMBUS, OHIO.

AVAILABLE CAPACITY

Our foundry has open capacity to supply small and medium size gray iron castings. Send sample. Address: OREGON CASTINGS CO., RD 3, Lititz, Pa.

Capacity Wanted

FOUNDRY PRODUCTION WANTED

Manufacturer and distributor has complete line of patterns for production of hard iron stars. Want foundry to produce them for distribution by National Sales Organization. Address: Box 148, The FOUNDRY, Cleveland 13, Ohio.

Employment Service

Foundry Manager—Grey Iron	$12,000
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Metallurgist—Stainless Steel	$ 7,200
2 Foremen—Grey Iron	$ 6,000

Write for application. Confidential. Established 33 years.

HARRISON PERSONNEL SERVICE
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$3,500—$35,000

If you are considering a new connection communicate with the undersigned. We offer the original personal employment service (38 years recognized standing and reputation). The procedure, of highest ethical standards, is individualized to your personal requirements and develops overtures without initiative on your part. Your identity covered and present position protected. Send only name and address for details.

R. W. BIXBY, INC.
101 DUN BLDG. BUFFALO 2, N. Y.

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$3,000—$25,000. This reliable service, established 1927, conducts confidential negotiations for high-grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Address: JIRA THAYER JENNINGS, 241 ORANGE STREET, NEW HAVEN 10, CONN.

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90 PER CENT OF THE CUPOLAS MELT UP TO ONLY 50 TO 60 PER CENT

capacity per hour—although the best and hottest iron is produced only when cupola is operated to its capacity. Report on your cupola may prove an eye-opener—usually the savings are surprising. Every pound of steel used in cupola mixtures reduces cost and increases strength 20 to 60%, because steel is purer than the most expensive pig iron. Watch the scrap pile—statistics prove casting losses can be held between 1 to 5% depending on the line of work. Our system is not an expense—but a valuable investment. Synopsis free.

McLAIN'S SYSTEM INC.
236 E. NORTH AVE.
MILWAUKEE, 12, WIS.

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Opportunities

OPPORTUNITY

For iron foundry to produce castings. We have a complete line of metal patterns for municipal and building castings. We want a foundry to produce castings for our distribution. Address: Box 149, The FOUNDRY, Cleveland 13, Ohio.

OPPORTUNITY

We can furnish at any point slack, fibre and tight barrels; also fibre and steel drums. Address: BUCKEYE COOPERAGE COMPANY, 3807 ORANGE AVENUE, CLEVELAND 15, OHIO.

MANUFACTURERS' OPPORTUNITY

This company has improved a permanent mold process that now produces aluminum enameled tubs, comparable to porcelain, which at one time produced cast iron tubs. Inquiries invited.

WAGNER PERMANENT MOLD CO.
2910 Empire Ave. Burbank, Calif.

PERMANENT MOLD SERVICE

Have you any problems? Let us take care of them. Complete service on all phases of permanent mold casting and foundry practice from drafting board to production running mold. Additional information gladly furnished on request. Address: PERMANENT MOLD SERVICE, BOX 526, CORNWALL-ON-HUDSON, NEW YORK.

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GRAY IRON FOUNDRY
FOR LEASE IN OHIO

Now under lease. Will be available soon. Good location. Good labor supply. Established over 75 years. Reasonable terms. Wonderful opportunity for good profits. New No. 3 Whiting cupola with skip charger and spencer blower and new dispatch 7' x 9' core oven—oil fired. Other improvements planned.

Box 152
THE FOUNDRY CLEVELAND 13, OHIO

FOUNDRY FOR LEASE

Gray iron foundry for lease. 60 miles from Detroit. Ten squeezers, wheelabrator — all equipped. Address: Box 158, The FOUNDRY, Cleveland 13, Ohio.

Foundries For Sale

FOR SALE

Well equipped foundry doing about $150,000.00 a year. Excellent accounts, profitable business. Selling price $35,000. Central Pennsylvania.

BOX 203

The FOUNDRY Cleveland 13, Ohio

GRAY IRON FOUNDRY

Small, well equipped foundry, squeezers, etc. Priced in line. Works in conjunction with machine shop.

CRAWLEY FOUNDRY & MACHINERY CO.
328 KETURAH STREET
NEWPORT, KENTUCKY

FOUNDRY FOR SALE

Nonferrous foundry, San Francisco bay district, capacity large enough to employ 50 men. Address: Box 150, The FOUNDRY, Cleveland 13, Ohio.

Foundries for Sale

NEW YORK, N. Y.
FOUNDRY FOR SALE

Or will take experienced foundryman in to run business who will invest in business. Located in El Paso with assets of approximately $10,000.00. Will sell on value of machinery, etc., furnishing good lease or will take in first class foundryman who will invest approximately $2500.00 with option to buy up to 1/3 of stock later. Foundry is in operating condition, machinery first rate, located on ground with trackage, plenty of business in this area. If interested please give full particulars on qualifications, etc. and whether interested in buying complete plant or part interest. Please write: SUN FOUNDRY AND SUPPLY, P. O. BOX 736, EL PASO, TEXAS.

FOUNDRIES FOR SALE

GRAY IRON FOUNDRY—Very profitable medium size foundry. Well established business. Priced low as owner is retiring.

GRAY IRON FOUNDRY—Produces castings up to 5 tons. Good building and equipment. Price $90,000.

EDWARD H. ZOLL
Industrial Properties Throughout the East
790 Broad St. Newark 2, N. J.

GRAY IRON FOUNDRY

Detroit area, 15-ton daily capacity. Modern equipment, suitable for castings up to 15# pounds. Large core capacity; new ovens. Attractive price and terms. Address: NORTHVILLE FOUNDRY, NORTHVILLE, MICH.

NONFERROUS FOUNDRY

Three miles from Chicago's loop. 4300 square feet of floor space. 2 jolt squeezers, etc. $4500 full price. $60 per month rent. Address: Box 211, The FOUNDRY, Cleveland 13, Ohio.

Wanted-To-Buy

WANTED PATTERNSHOP

Experienced patternmaker, wood and metal patterns, wants to acquire part interest or buy out pattern-shop. Prefer small or large shop producing first class patterns and core boxes, etc. Will go anywhere and can obtain own men. Address: Box 221, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Steel foundry making in considerable tonnage at low cost, steel castings and ingots or billets. Address: Box 215, The FOUNDRY, Cleveland 13, Ohio.

WANTED

#1 or #2 Demmler core blowing machine. Address: CENTRAL BRASS MFG. CO., 2950 E. 55th ST., CLEVELAND 4, OHIO. VU 3-0220.

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price for immediate acceptance. Address Box 578, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Belt or motor driven two head planer, table 3' x 10', cross rail clearance above table 30" or 36"; also 24" shaper. Address: Sanitary Co. of America, Linfield, Pa.

For Sale

FOR SALE

Beardsley & Piper speedmuller, less than one year old, fully equipped with skip hoist and blower equipment. Cost $8200; will handle sand for 20 molders. No reasonable offer rejected. Address: Box 212, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

15 x 20 Wheelabrator tumblast—used only 90 days. Address: NATIONAL ALUMINUM & BRASS FOUNDRY, INC., INDEPENDENCE, MO.

For Sale

FOR SALE

No. 372 Besly 53" vertical spindle disc grinders, including radial arm truing device and V-sheave on spindle, but less motor, belts and controls. Equipped for dry grinding but can be changed for wet. Net weight—6820 lbs. $1250

No. 208 Besly 23" and 30" single spindle disc grinders with wheel guards and geared lever feed tables. Furnished with or without new motor drive. Net weight—3240 lbs. 23".. $600

30".. $700 (Prices without motors)

Grinding Wheels for use on the above machines, Norton, Besly and Gardner, size No. 16 grain for cast iron and refractory grinding in stock. Have substantial saving to offer on wheels we have in stock.

All grinders guaranteed in first class condition, having seen very little use. We will ship on open account, subject to inspection at destination, to firms of approved credit. All prices are net, f.o.b. Shreveport, Louisiana.

FREDERIC & BAKER

826 ARDIS BLDG. SHREVEPORT 91, LA.

FOR SALE

2 Model S; B & P Screenarators—rubber wheels
3 Foundry Type Cab Operated Shepard-Niles Cranes, 5 ton capacity, 27' 3" span—Motors 230 DC; like new.
1 Gardner-Denver Air Compressor, new in 1945; Size 6½ x 5½—Cap. Actual air 130 ft. at 125 lb. "V" belt drive—mounted on base with 30 hp motor.

Send us your inquiries on any foundry equipment.

RAY P. SCULLY,
SCULLY MACHINERY & EQUIPMENT CO.
(Not Inc.)
767 Milwaukee Ave.
Chicago 22, Ill. Phone: Canal 0314

LATEST MODEL FOUNDRY EQUIPMENT

Complete sand handling system
Fisher—1000 lb. & 500 lb. aluminum furnaces
Vertical core ovens
Osborn & Tabor moulding machines
25 H.P. rotoclone blowers
345 ton United Engineering forging press—"C" type
3000 lb. "Automatic" electric fork lift trucks

WE INVITE YOUR INQUIRIES

BALCHER MACHINERY SALES
1819 E. 33rd St. Cleveland 14, Ohio
HEnderson 1765

FOR SALE

3—No. 1 Moline Portable Hand Squeezers $25.00 each
2—36" x 48" Whiting Round Tumbling Mills with line shaft & pulley wheels, $300.00 each
1—32" x 32" x 48" square Whiting Mill $200.00

DeKALB FOUNDRY CORP.
DeKALB, Illinois

FOR SALE

New Simpson intensive mixer No. 2 never used. This mixer has water-cooled bottom, 42 inch crib, speed reducer, 20 horsepower motor and magnetic starter for 3-phase, 220 volt current. Address: NATIONAL BY-PRODUCTS, INC., ATTENTION F. E. JOYCE, BOX 615, DES MOINES, IOWA.

FOR SALE

No. 193-4 Milwaukee jolt, squeeze, strip moulding machine, new 1942.

No. 1N Simpson intensive mixer, new 1945.

MILES MACHINERY CO.
SAGINAW, MICH.

Classified Advertising

For Sale

FOR SALE

One 42 x 48 Skip Hoist Loader for American Wheelabrator complete with motors, ready to use. Good condition. Price $500. Address Box 162, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

20—13" and 14" combination jolt squeeze strip molding machines, completely overhauled.

SUTTER PRODUCTS CO.
2005 WESTWOOD AVE. DEARBORN, MICH.

FOR SALE

1—Wheelabrator size 15 x 24 complete with dust collector.

PATERSON BRASS MFG. CO, INC.
8 Peach St.
PATERSON, N. J.
SHerwood 2-5768

FOR SALE
CORE RODS

51000#—5/32" Rd. M.S.—14"
54000#—3/16" Rd. M.S.—14"

IRON & STEEL PRODUCTS, INC.
43 YEARS' EXPERIENCE
13444 S. BRAINARD AVE., CHICAGO 33, ILL.
"ANYTHING containing IRON or STEEL"

FOR SALE

WASHINGTON FILLMORE FOUNDRY INC.
153 FILLMORE AVE.
BUFFALO, N. Y.

1—Herman 2500 lb. roll-over molding machine with 5 ton bumper.

FOR SALE
AND
IMMEDIATE SHIPMENT

1—No. 8 Sly centri-blast revolving table—Steel shot or grit blasting machine complete with motors and starters.
Used but in good operating condition. Price on request.

MASCOT STOVE CO.
CHATTANOOGA 2, TENN.

TURBO BLOWERS

2—Spencer-Turbo, 3500 CFM @ 40 oz., Lot #26468, Serial Nos. 27778 & 27779 with 60 HP, Louis Allis, 3/60/220-440 V., Multispeed Motors.
2—N. American, 2700 CFM @ 16 oz., with 20 HP, G.E., 3/60/220-440 Volts, 3600 RPM.

EXHAUST FANS

36"—3 HP, 3/60/220 or 440 V., 900 RPM, TEFC.

STATE MACHINERY & METAL CO.
160-2 GOVERNOR ST. PATERSON, N. J.
ARmory 4-4959 or 4971

FOR SALE

New heavy duty motorized rod cutter, 65 cuts per minute; capacity: ¾ inch round hot rolled steel. Brand new, $890.00 f.o.b. Cleveland. Address: The Federal Foundry Supply Co., 4600 East 71st St., Cleveland 5, Ohio.

FOR SALE

American Wheelabrator size 27, 5 ton # G 50 shot, steel flasks, molding machines, oil burners, furnaces, blower and other equipment. Address: H. G. WILLIAMS, 7206 EAST FIFTEENTH ST., KANSAS CITY 3, MO.

For Sale

FOR SALE

700 Tons 3 11/16" Rounds, Lengths 10'10" to 12'6" having the following analysis: C .64 to .67—Phos. .012 to .019—Silicon .28 to .29—Chrome .43 to .44—Manganese 1.26 to 1.31—Sulphur .021 to .025—Nickel .52 to .53—Moly .11 to .12.

Above material available for prompt shipment.

If interested

WRITE — WIRE — PHONE

GLAZER STEEL CORPORATION

KNOXVILLE, TENNESSEE

2100 Allor Avenue—Phone 4-8601

FOR SALE

2—Royer Sand Blenders
2—Osborne #602 Jolt Rollover Pattern Draw Molding Machines
2—Osborne #276 Jolt Squeezers
1—Gehnrich Continuous Core Oven
1—Osborne #243 Jolt Rollover Pattern Draw Molding Machine
2—Beardsley & Piper Screenerators
1—Jefferies Sanditioner
All equipment in excellent condition and priced for quick sale.

BOX 219
The FOUNDRY Cleveland 13, Ohio

FOR SALE

2—Model HS Hough Payloaders thoroughly rebuilt, about 2 years old. Price each f.o.b. our warehouse Rock Island, Ill. $1650.00.

A. E. HUDSON COMPANY
11th St. & 51st Ave., Rock Island, Ill.
Phone—RI 7252

FOR SALE

90—Sets of used 12" x 14" to 18" x 24" Hines Pop-Off Flasks.
30—Sets of used 16" x 21" Shanafelt Flasks.
2—Osborn #42 Core Blowers.
2—Tabor Rollover Molding Machines.
1—Osborn #321 Jolt Squeeze Rollover Molding Machine.
1—Davenport #24-SA Rollover Molding Machine.
1—Osborn Rollover Core Machine.
7—Milwaukee #1439 Jolt Squeeze Molding Machines—Air Operated.
Note: All machines purchased new in 1944.

D. E. DONY MACHINERY CO.
47 LAURELTON ROAD
ROCHESTER 9, NEW YORK

FOR SALE

1—Johnson & Jennings #815 Jolt Rollover
1—Johnson & Jennings #682 Jolt Stripper
(These items have never been used)
1—Electric Motor—10 HP, 60 cycle, 220-440 volt, 3600 RPM with or without American Blower.
(Used but in good condition)

FRANTZ PATTERN & FOUNDRY CO.,
2201 E. ARTESIA ST.,
LONG BEACH, 5, CALIF.

FOR SALE

1—6,000 pound capacity Timken Worm Gear Crane Ladle with "V" bail, riveted steel trunnions, and solid outside teapot spout. Never used. Address: E. J. WOODISON CO., 7415 ST. AUBIN AVE., DETROIT 11, MICH.

For Sale

FOR SALE

1—Riehle tensile testing machine, 200,000#.
1—Tinius Olsen 50,000# tensile testing machine with 1 HP motor.
Vibrating screens, single and multiple deck, Tyler Hummer, Allis Chalmers, up to 5' x 10' screen surfaces.
Simpson intensive and Lancaster mixers, dry and wet pans.
Chaser mills, etc. Various sizes.
Send us your inquiries.

CONSOLIDATED PRODUCTS CO., INC.
13-20 PARK ROW NEW YORK 7, N Y.

FOR SALE

Steel Core Plates
17½ x 32 x 3/16 or 1/8
$2.00 ea.

GLAZER BROS. ANDERSON, IND.

EQUIPMENT FOR SALE

13' Beardsley & Piper Tractor-Type Sand Slinger with Magnetic Separator Tower; Sand Leveling Device; 16"x4"x20 HP Head; Arms: 6'-0" & 4'-0"; Turning Device; 220 Volt, 3-phase, 60 Cycle; Serial No. T-178. Installed new during 1946 and used one shift for 5-6 months. Condition: Excellent—Like New.

L. J. MUELLER FURNACE CO.
MILWAUKEE, WISCONSIN.

EQUIPMENT FOR SALE

1—Macleod 36" x 36" sand blast barrel, motors and collector, practically new shape.

1—New Haven model "C" blast barrel, used, good shape.

Both Detroit district.

BOX 206
The FOUNDRY Cleveland 13, Ohio

FOR SALE
TURBO COMPRESSOR
CUPOLA BLOWER

Used one year, 1# pressure, #3 discharge with one 16" blast gate motor, 30 H.P., 1750 R.P.M., 220-440 V, 3 phase, 60 cycle for $1400.00. Immediate delivery.

PRODUCTION PATTERN & FOUNDRY CO.
BOX 299 CHICOPEE, MASSACHUSETTS

PRICED FOR IMMEDIATE SALE—
USED FOUNDRY AND OFFICE EQUIPMENT

1 Pangborn 48" x 54" type GK-21 roto-blast barrel—ser. #21GK2-402 with skip hoist loader, 220 volt, 60 cycle, 3 phase, complete with motor control equipment.
2 Chicago Pneumatic vertical air compressors, class PB4, size 8-3/8" x 4¾" x 5", 2 stage, 4 cylinder, single acting, air cooled, 225 C.F.M. 100# pressure, constant speed, complete with 50 H.P., 1800 R.P.M. 220/440 volt motors and controls.

12—Arcade #81 jolt squeeze molding machines, 8½" squeeze cylinder, 3" jolt cylinder.
2—Arcade #91 jolt squeeze molding machines, 10" squeeze cylinder, 4" jolt cylinder.
1—Toledo dial platform scale, model 38—2741FE, 8' x 6', built in scale, complete with smooth ⅜" steel plate 81" x 61" platform, 10 ton capacity.
10—Pneumatic I-R & Thor grinders.
1—"Milwaukee" sprue cutter, manufactured by J. C. Busch Company, capacity in steel is 3 sq. inches.
1—GE motor for cupola blower: #1003135, type 1-2-75/90, 3600 Form K, 60 cy., 220 volt, 75/95 HP, 121/212 amp., 3600 RPM no load, 3530 RPM full load, with auto transformer reduced voltage starter and overload relay.
1—Core oven, shelf type, 7' 6" high x 8' 4" wide x 3' 9" deep, 7 shelves, coke fired.
4—Underwood Elliott Fisher bookkeeping machines, CAX6AE series.
2—Underwood Typewriter fanfold billing machines.

GREDE FOUNDRIES, INC.
1320 S. First Street, Milwaukee 1, Wis.
Telephone: Mitchell 5-2450

Classified Advertising

For Sale

FOR SALE

MOLDING MACHINES—

1—Tabor Split Pattern Jolt Squeeze Air Operated, Serial 20867.
1—Tabor Split Pattern Jolt Squeeze Air Operated, Serial 19097.
1—Tabor Split Pattern Jolt Squeeze Air Operated, Serial 19265.
1—Tabor Split Pattern Jolt Squeeze Air Operated, Serial 18458.
1—Tabor Jolt Squeeze, Yoke type, 13" x 18", Air Operated, Serial 27139.
1—Tabor Split Pattern Jolt Squeeze, 13" x 18", Air Operated, Serial 20363.
1—Osborn #42, portable, rollover, Air Operated, Serial 10377-D.
1—Osborn #42, portable, rollover, Serial 10377-B.
1—Tabor 10", Special Shockless Jar Squeezer, (end. brg. mch.) Serial 25086.
1—Tabor 10", Special Shockless Jar Squeezer, (end. brg. mch.) Serial 25085.

SAND HANDLING SYSTEM—

Link Belt Conveyor for sand distribution 18" x 105' with ten 21" x 7" plows, 10 steel hoppers 24" x 18" x 60" and plank walk 2' x 120'.
Motor for above 3 hp. G/E 1720/60/220/440, with chain drive to reducer unit.
Link Belt conveyor for shakeout 18" x 110'.
Motor for above 3 hp. G/E 1800/3/60/220-440 direct connected to reducer unit.
Link Belt Conveyor (crossover in pit) 18" x 7' cc.
Motor for above 1 hp. G/E 1130/3/60/220-440.
Link Belt Conveyor 18" x 12' cc.
Motor for above 2 hp. G/E 1740/3/60/220-440 direct connected to reducer.
Screen, Hopper Type, 3' x 8'.
Motor 3 hp. G/E 1720/3/60/220-440, V Belt Drive.
Elevator, Bucket Type, 12" x 35' rubber belt.
Motor for above 5 hp. G/E 1735/3/60/220-440 direct connected to reducer.
Link Belt Conveyor 18" x 25'—motor driven. F64.
Elevator, Bucket Type 12" canvas belt 34' cc.
Motor for above 5 hp. G/E 1800/3/60/220-440, chain drive.
Link Belt Areator, mill type 8'-6", 1x1'-6", wX36"h.
Motor for above 5 hp. G/E 1150/3/60/220-440, V Belt drive.
Sand Storage Bin 60 ton.
Jeffrey Areator with 7½ hp. motor.
Revolving Screen 4' diam. with gear reducer.

MISCELLANEOUS EQUIPMENT—

Simpson Sand Mixer #2 with 20 hp. motor.
Ball Mill, Marcy #32 with Wilfley concentrating table. #11-0 & 10 hp. motor.
Riddle, Combs Gyratory 18" diam. with 1/6 hp. motor 860/3/60/220.
Riddle, Combs Gyratory 20" diam. with 1/6 hp. motor 860/3/60/110.
2—Sprue Cutter, Tessmer ¾" sq. Model H, less motor.
Sprue Cutter, 14" throat "Benj. Middleton" with motor.
Monarch 300# Crucible Tilting Furnace, with mechanism, less motor.
10—Bohn Oil Fired Brass melting furnaces, pit type, for No. 80 crucible.
3—"Standard" Snagging Grinders, double end, 18" wheel.
2—Motors G/E 1/3 hp. 3/60/220.
3—Motors G/E ½ hp. 3/60/220.
1—Motor G/E 1/6 hp. 3/60/220.
Blower, G/E low pressure 32 oz. 1600 CFM with 20-24 hp. motor 3600/3/60/440.
Motor, 25 hp. 1200/3/60/220-440—need rewinding.
North American Blower, 160 oz. 275 CFM with 2 hp. motor G/E 3450/3/60/220-440.
"Spencer Turbo" Blower 16 oz. 250 CFM with 2 hp. motor G/E 3500/3/60/220-440.
Mathews Roller Conveyor 60' x 16" high roller 6" cx 2½" rolls, ball bearing with stand.
Mathews Roller Conveyor 210' x 16" low roller 6" cx 2½" rolls, ball bearing with stand.
286 Steel Squeezer Flasks 12" x 18" cope & drag.
463 Tabor flasks 12" x 18" cope & drag.

(Cont'd. top of next column)

1 Snap Flask 10" x 20" cope & drag.
1 Snap Flask 14" x 19" cope & drag.
2 Snap Flasks 14" x 16" cope & drag.
1 Snap Flask 13¾" x 18¾" cope & drag.
1 Snap Flask 14" x 14" cope & drag.
1 Snap Flask 12" x 20" cope & drag.
1 Snap Flask 12" x 22" cope & drag.
944 Bottom Boards (wood) 12" x 18".
50 Bottom Boards (wood) 13¾" x 13¾".
150 Bottom Boards (wood) 11¾" x 21¾".
268 Bands for 12" x 18" snap flasks.
34 Squeezer Flask uplifts.
448 Flask weights.
3 pr. Crucible Tongs for No. 80 crucible.
3 Core Setting Tables (revolving).
4 Carrying Shanks for No. 80 crucible.
1 Time Meter G/E mod. 8KT 2a-26, 460v/60 cy.
1 Pump control-low water cutoff or alarm, "McDonald Miller" #152.

BOHN ALUMINUM & BRASS CORPORATION
Purchasing Department—Detroit, Michigan

ROTOBLAST FOR SALE

Pangborn No. 28, Type G. K., capacity 28 cu. ft., complete with loader, abrasiye reclaimer and spare parts. New 1942—in service when taken out. Price for machine and parts very attractive—slightly more than value of spare parts alone. Address Box 163, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Two foundry shakeouts, 3 x 5-foot Simplicity with TEFC motors (G.E.); good condition, slightly used; priced to sell. Address: P.O. Box 55, East Detroit, Mich.

FOR SALE

1—Johnston & Jennings #683 stationary jolt stripper. Table 36" x 54"—pattern draw 16"—excellent condition. Address: Box 191, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

TURBO BLOWERS
150 cfm @ 3 lb. Spencer with 5 HP 3600 RPM motor
PRESSURE BLOWERS
1400 cfm @ 8 oz. Robinson with 5 HP, 3/60, 3600 RPM motor
1100 cfm @ 16 oz. Sturtevant
450 cfm @ 6 lb. A & B with 30 HP motor
250 cfm @ 12 oz. GE with 2 HP motor
HOISTS
¼ Ton—Detroit Titan—440/3/60
¼ Ton—Budget—220/3/60
¼ Ton—Comet—440/3/60
¼ Ton—Shephard—220 D.C.
½ Ton—Chisholm Moore—440/3/60
½ Ton—Cleveland—440/3/60

THE MOTOR REPAIR & MFG. CO.
1522 HAMILTON AVENUE
CLEVELAND 14, OHIO

FOR SALE

1—18" x 25" Roots-Connersville positive pressure blower with 125 H.P. motor.
1—Motor operated Butterfly valve.
4—3 Ton Whiting steel converter shells with 2 tilting assemblies.
1—Champion 48" x 48" x 8" draw power flask push-off machines.
1—Osborn Jolt, rollover, draw molding machine.
5—Osborn Jolt strip molding machines.
2—Nichols Jolt, squeeze molding machine.
1—Nichols Jolt table.
2—Osborn Jolt, rollover squeeze molding machine.

GUNITE FOUNDRIES CORP.
ROCKFORD, ILL.

SAND BLAST MACHINES

We have in stock three brand new complete portable sand blasting machines 100 pound, 350 pound and 650 pound capacity in sand. Can be used with steel grit also. New "Sanstorm" type, non-clogging design. Ideal for auto body shops, foundries, heat treaters, painters and forge shops. We also have in stock for immediate shipment a #22 Moline portable molding machine (brand new) also a used belt drive tilting tumbling barrel.

FEDERAL FOUNDRY SUPPLY COMPANY
4600 EAST 71st ST. CLEVELAND 5, OHIO

FOR SALE

Modern 900 ton commercial steel foundry producing profitably in Central Ohio, light and heavy castings. Address: Box 214, The FOUNDRY, Cleveland 13, Ohio.

For Sale

EQUIPMENT FOR SALE

MOLDING MACHINES
3—75J Osborn Jolt Squeeze
2—SPO #611-B Stationary Oscillating Squeeze Strippers
1—SPO #4½ JHS Air Jolt Hand Strip
1—Tabor Plain Squeeze, Strain Rod Type
3—Mumford 3" Cyl. Core Jolt, with 20" x 15" Table

BLOWERS FOR CUPOLAS AND FURNACES
6—#805 General Blowers, 5 HP, 3/60/220, 1400 CFM at 8-oz. pressure
Maxon-Premix Blowers for Gas, ⅛ to 1 H.P.

METAL MELTING EQUIPMENT
1—Recirculating Gas Fired Oven with all controls, suitable for Core Oven
2—Hausfeld 1000# Aluminum Capacity Furnaces, Barrel Type, Open Flame, Oil Fired
2—Hausfeld 2000# Aluminum Capacity Furnaces, Barrel Type, Open Flame, Oil Fired
3—Stationary Gas Fired #60 Crucible Furnaces, with ¼ H.P. Maxon-Premix Blowers
2—Monarch-Rockwell Rotating, 500# Brass. Oil New 32" to 41" Dia. Shell Cupolas made to order

TUMBLING MILLS AND SAND BLAST
1—Pangborn #2 Barrel, Suction Feed, Motor Drive, Complete
1—American Foundry Equipment Co. No. 1 Multi-table Wheelabrator with 12-8" dia. work tables. Complete unit.
2—Pangborn No. 2 GH direct pressure type sandblast barrels, motor driven. Complete units.
1—Pangborn LE 6 ft. sandblast table, continuous sand feed, motor driven. Complete unit.
1—Pangborn LE 4 ft. sandblast table, continuous sand feed, motor driven. Complete unit.
3—Pangborn type AV direct pressure sandblast generators. Sand capacity 650#.
1—Pangborn Sand Blast Unit including generating tank, shot cleaner, bucket elevator and dust collector with motor. Suitable for use with room.

1—Mono-Rail System Complete with approximately 1200 ft. of track, 74—250# capacity 110 Volt hoists, two and four wheel trolleys, switches, 35—2000# 20 ft. bridges, and all necessary parts to install.

MISCELLANEOUS
4—Heavy duty flexible shaft grinders 2 HP
30—Jib Cranes, Floor Type, 1000 to 4000 lbs. capacity, 180° swing, 10 to 15 ft. arms
30—1000 lbs. Capacity Budget Electric Hoists
5—Low Lift Electric Trucks, 2000 lbs. capacity and up. Riding Operator Style
1—Heavy Duty Back Geared Sprue Cutter, 1⅛" square knives, T & L Pulley Drive
Miscellaneous Electrical and Gravity Conveyor Systems

CLIFTON MACHINERY CO.
1023 W. 6th ST. CINCINNATI 3, OHIO
PHONE PARKWAY 7812

HOISTS FOR SALE

All types and sizes—AC & DC . . . always in stock—motors, reducers, pumps, blowers and machine tools. Address: STATE MACHINERY & METAL CO., 160-2 GOVERNOR STREET, PATERSON 1, NEW JERSEY.

FOR SALE

1—Tabor rollover machine, air turn over, hand draw. 10" draw. Address: LIKE-HEARTS INDUSTRIES. SPENCERVILLE, INDIANA. PHONE: 30.

FOR SALE

Patent No. 2,052,465 and wood and metal pattern equipment for producing water meter box covers. $1,500.00. Address: FRED E. HARDY, JR., 306 E. MAIN ST., SHELBYVILLE, ILLINOIS. PHONE 570.

Classified Advertising

For Sale

FOR SALE

2—Despatch S-type core ovens, gas fired, complete with heater and automatic controls. Core racks included.

HAMMOND BRASS WORKS

HAMMOND **INDIANA**

ROLLER CONVEYOR

2320 feet gravity roller conveyor 60 6' 90° curves

240 pr 36" high floor supports

Excellent condition—in use 15 months. Call or write—

ANDERSON STOVE CO, INC.

V. G. ROTHROCK, PUR. AGT.

ANDERSON, INDIANA

For Sale

FOR SALE

6000 Tons Ingots—Open Hearth poured to any size and chemistry, .09 carbon and higher. Immediate delivery—Price $118.00 per net ton delivered any point in the East or Middle West.

BOX 174

The FOUNDRY **Cleveland 13, Ohio**

For Sale

FOR SALE

OVERHEAD ELECTRIC TRAVELING CRANES

Tons	Make	Span	Current
5	Northern	21'0"	230-VDC.
5	Northern	25'0"	230-VDC.
5	Milwaukee	50'0"	230-VDC.
10	Northern	37'10"	230-VDC.
5	Milwaukee	60'0"	220-VAC.
25	Alliance	55'0"	230-VDC.

ELECTRIC MONORAIL HOISTS

QU.	TONS	MAKE	CURRENT
7	½	Lo-Hed & Shepard	230-VDC.
1	1	Shaw-Box	220-VAC.
1	2	Shepard	230-VDC.
1**	2	Shepard	220-VAC.
1*	2	Shepard	230-VDC.
3*	3	Lo-Hed	230-VDC.
1*	5	Lo-Hed	220-VAC.

*—2-Motor, Fl. Op. **—2-Motor, Cg. Op.

ALL ABOVE IN STOCK OFFERED REBUILT & GUARANTEED

SEND FOR OUR STOCK LIST OF A.C. & D.C. GENERAL PURPOSE CRANE & MILL MOTORS, ELECTRIC BRAKE & CONTROL EQUIPMENT, MOTOR GENERATOR SETS, TRANSFORMERS, ETC., OF ALL SIZES.

T. B. MACCABE COMPANY

4300 CLARISSA ST.

PHILADELPHIA (40), PENNA.

FOR SALE

1—Milwaukee sprue cutter with variable speed motor. Practically new. $675.00. Address: Ak-Sar-Ben Mfg. Co., 4520 South 36th St., Omaha 11, Nebraska.

FOR SALE

4' x 6' Simplicity shake-out with special baffles, complete with one 5 H.P. type K.H. 1800 R.P.M. motor. Excellent condition, used very little. $1,000 for quick sale. Address: STANDARD FOUNDRY, CADILLAC, MICHIGAN.

CLASSIFIED ADVERTISING RATES

POSITION WANTED—Minimum advertisement set solid, 30 words, $2.00. Additional words 7c each.

ALL OTHERS—"Help Wanted"—"For Sale"—"Wanted"—"Personals"—"Services", etc., minimum advertisement set solid, 30 words or less, $4.00. Additional words 12c each.

NOTE—If replies are to be sent to a box number in care of THE FOUNDRY, add 6 words to your advertisement for box number and address.

Any advertisement set in all capital letters, add 50% to the above rates.

INCH RATES PER INSERTION

Single Column 2¼" Wide	One Time	Three Times	Six Times	Twelve Times
1 inch	$ 12.00	$ 11.00	$ 10.00	$ 9.00
2 inches	21.75	20.00	18.25	16.75
3 inches	32.00	29.25	26.75	24.00
4 inches	40.00	36.75	33.25	30.00
5 inches, ½ col.	48.00	44.00	40.00	36.00
6 inches	58.75	53.25	48.00	42.75
7 inches	66.00	60.00	54.00	48.00
8 inches	73.25	66.75	60.00	53.25
10 inches, 1 col.	88.00	80.00	72.00	64.00
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- *Valve refinishing shops*
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-BAKE while you LOAD

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SPEEDS UP CORE PRODUCTION
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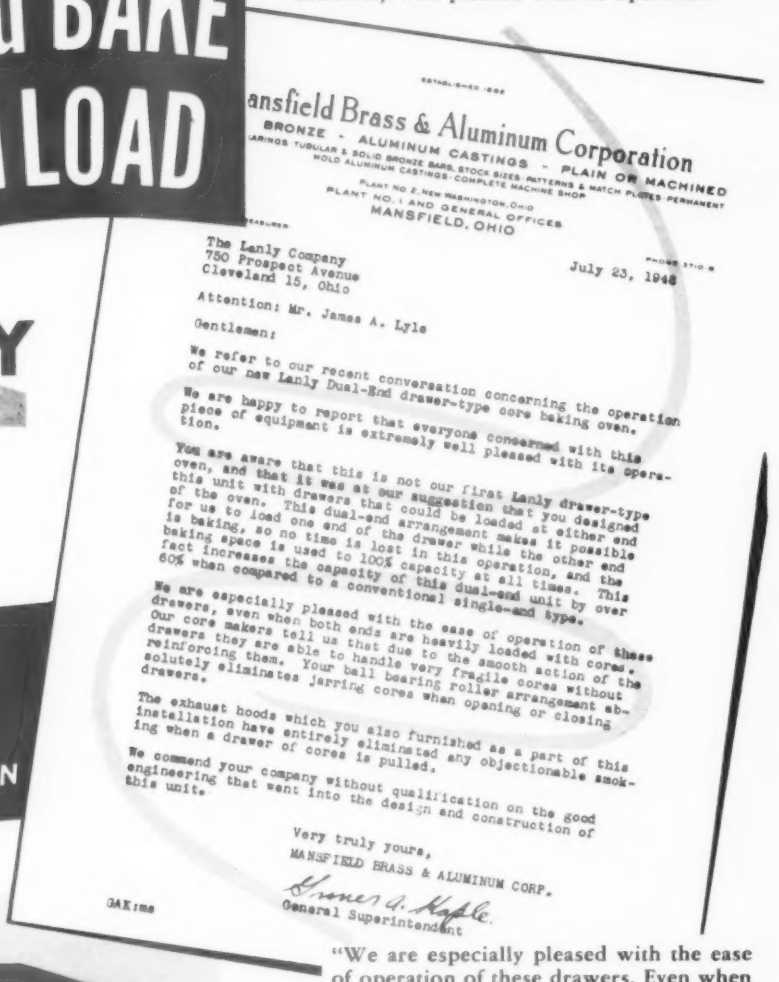
SMOOTHER NO-JAR DRAWER ACTION

"We are happy to report that everyone concerned with this piece of equipment is extremely well pleased with its operation."



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The Lanly Company
750 Prospect Avenue
Cleveland 15, Ohio

July 23, 1948

Attention: Mr. James A. Lyle

Gentlemen:

We refer to our recent conversation concerning the operation of our new Lanly Dual-End drawer-type core baking oven.

We are happy to report that everyone concerned with this piece of equipment is extremely well pleased with its operation.

You are aware that this is not our first Lanly drawer-type oven, and that it was at our suggestion that you designed this unit with drawers that could be loaded at either end of the oven. This dual-end arrangement makes it possible for us to load one end of the drawer while the other end is baking, so no time is lost in this operation, and the baking space is used to 100% capacity at all times. This fact increases the capacity of this dual-end unit by over 60% when compared to a conventional single-end type.

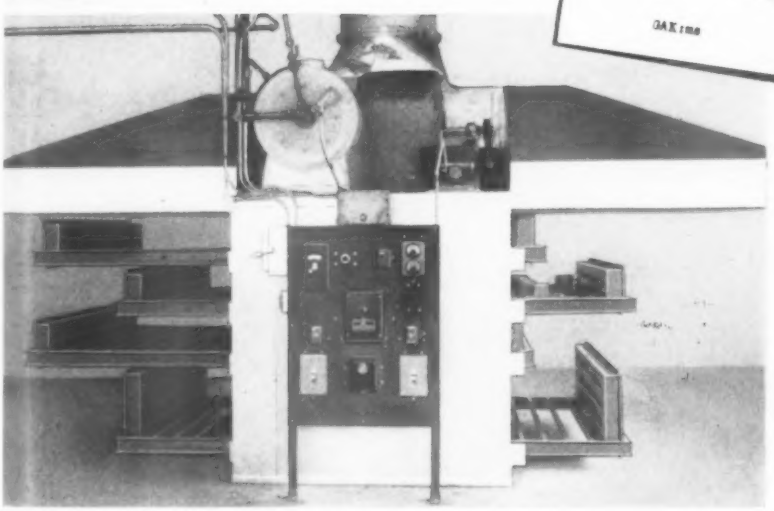
We are especially pleased with the ease of operation of these drawers, even when both ends are heavily loaded with cores. Our core makers tell us that due to the smooth action of the drawers they are able to handle very fragile cores without reinforcing them. Your ball bearing roller arrangement absolutely eliminates jarring cores when opening or closing drawers.

The exhaust hoods which you also furnished as a part of this installation have entirely eliminated any objectionable smoking when a drawer of cores is pulled.

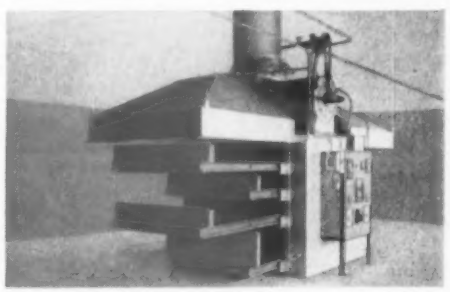
We commend your company without qualification on the good engineering that went into the design and construction of this unit.

Very truly yours,
MANSFIELD BRASS & ALUMINUM CORP.
Homer A. Kapple
General Superintendent

OAK:ms



"We are especially pleased with the ease of operation of these drawers. Even when both ends are heavily loaded we are able to handle very fragile cores without reinforcing them."



"This dual-end arrangement makes it possible for us to load one end of the drawer, while the other end is baking, so no time is lost. Baking space is used to 100% capacity at all times. Capacity is 60% greater than a single-end type."

The above letter from Mansfield Brass & Aluminum Corporation of Mansfield, Ohio, is strong testimony of their satisfaction with LANLY SERVICE. Almost sufficient by itself is the closing paragraph,

> "We commend your company without qualification on the good engineering that went into the design and construction of this unit!"

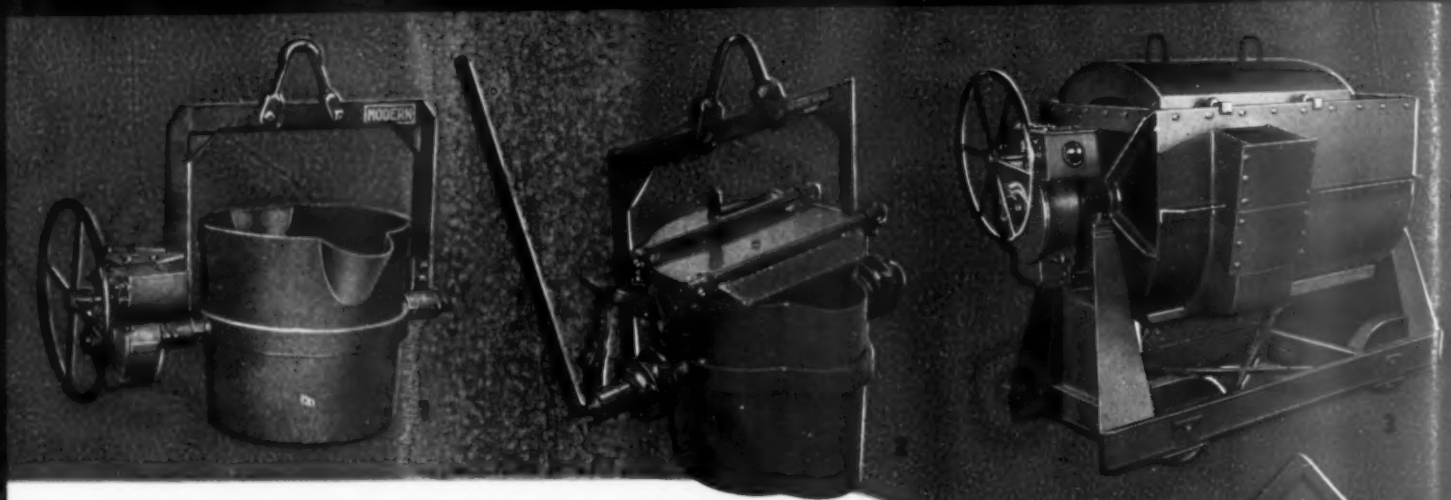
THE LANLY CO.
OVENS FOR INDUSTRY
HEATED BY GAS, OIL, ELECTRICITY OR STEAM
750 PROSPECT AVENUE · CLEVELAND, OHIO

The LANLY Co.
Cleveland, Ohio

- ☐ Send information regarding Dual-End Ovens.
- ☐ Send information regarding ..... Ovens.
- ☐ Have representative call when in this vicinity.

Company .....
Address ..... By .....

Clip to your letterhead and mail.



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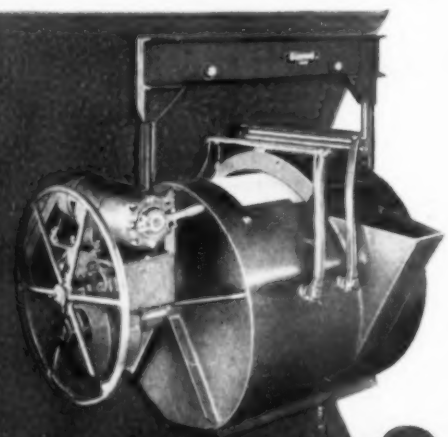

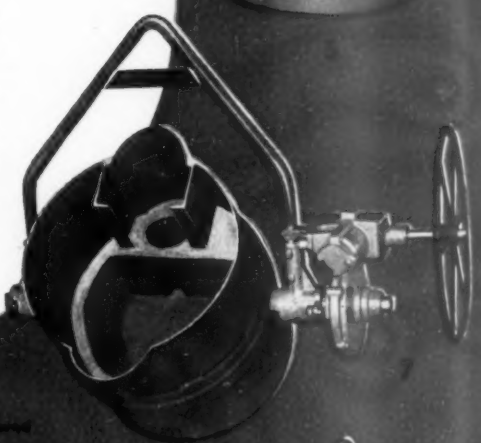

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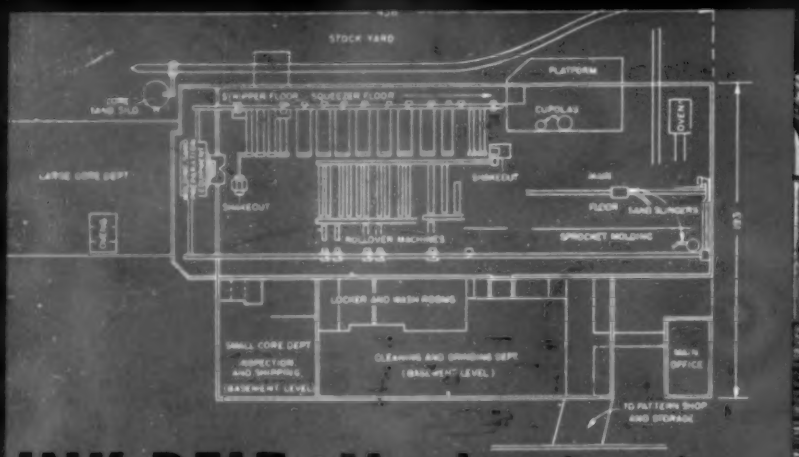

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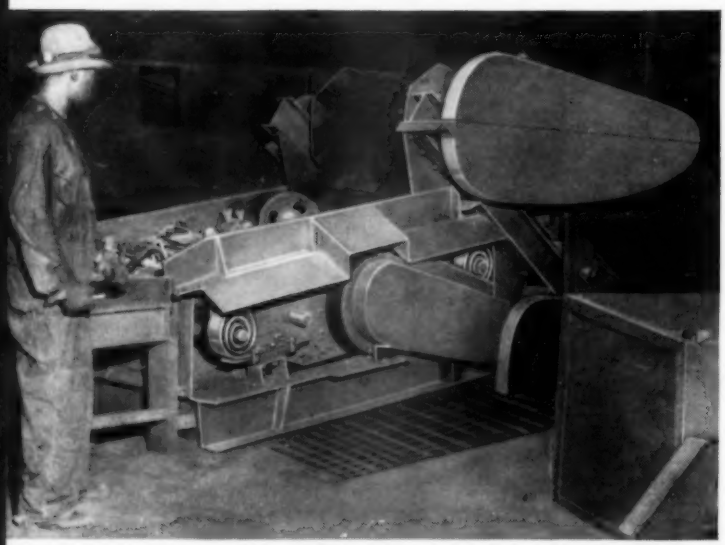
Hikes Jobbing Foundry Capacity 100 in Same Floor Area



Above: This shakeout screen handles molds from squeezer floor. Sand and castings are transferred to this point by oscillating conveyor located under the floor and by an apron conveyor.

Molding sand additions are carefully measured Showing part of the sand preparation equipment.

Faced with increased demand for castings and necessity of combatting rising production costs, Olney dry, like many other foundries, took steps to additional capacity. The result: without any inc floor space and with a minimum of building chan foundry has been able to increase the tonnage iron castings from 400 tons monthly to between 1000. This was accomplished without interruptin tions, and despite the fact that it is a jobbing pla ducing a wide variety of castings, and with d analyses of metal.

Link-Belt handling equipment at Olney inclu following: oscillating conveyor handling two vari sand, and castings of varying sizes...apron convey discharges onto shakeout screen . . . belt conveyors sand from shakeout and from oscillating convey bucket elevators taking sand to screens over stora . . . belt conveyors and elevators handling san mullers to aerators . . . distributing belt conveyo plows conveying sand to individual hoppers as

This equipment serves squeezer and stripper lines, side floor containing jolt roll-over machin stripper machines, stationary and locomotive san ers, and also provides prepared sand for floor m

Foundry mechanization has become essential to able operation. An experienced Link-Belt Found gineer will be pleased to analyze your present ope without obligation.

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